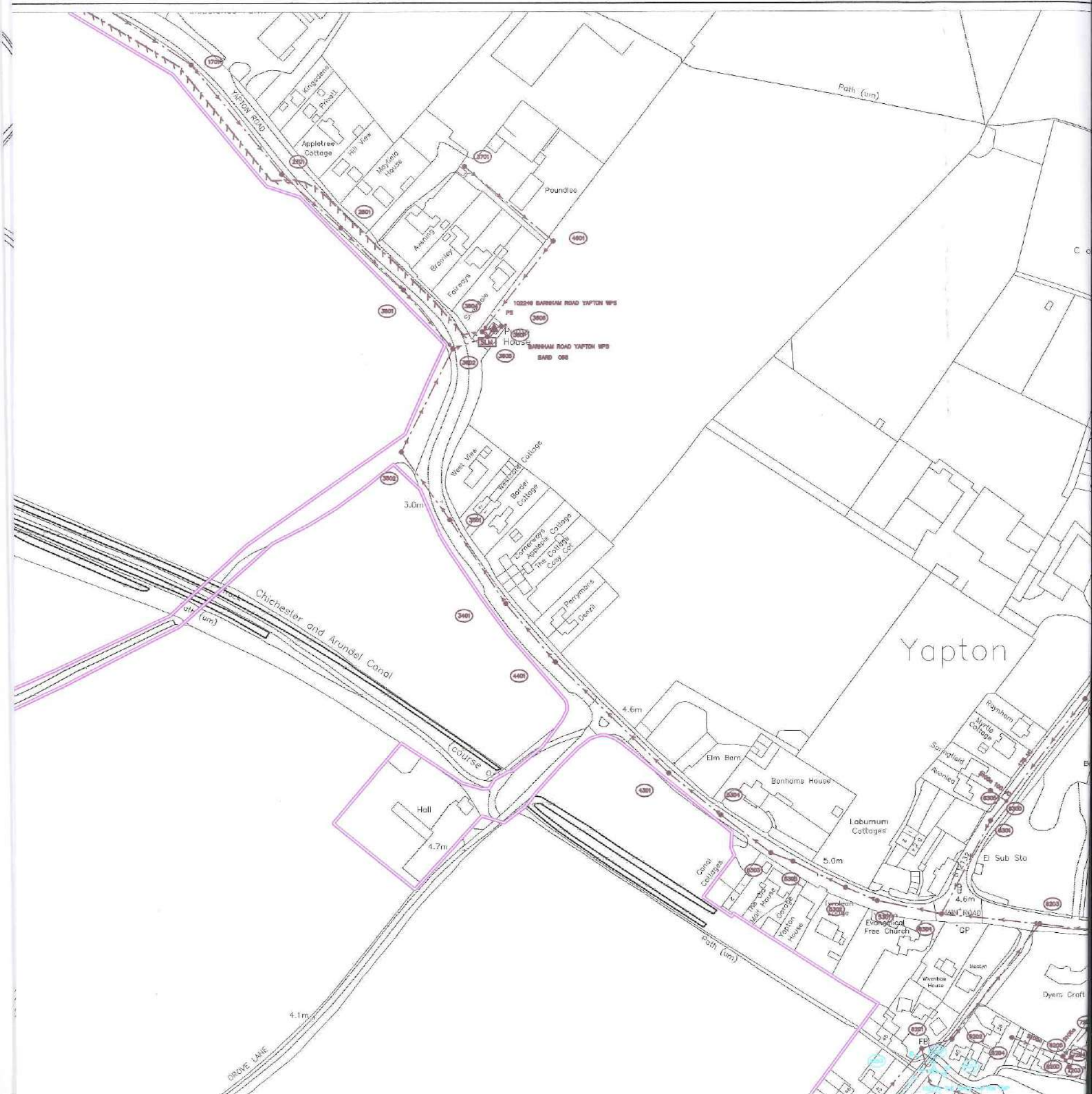


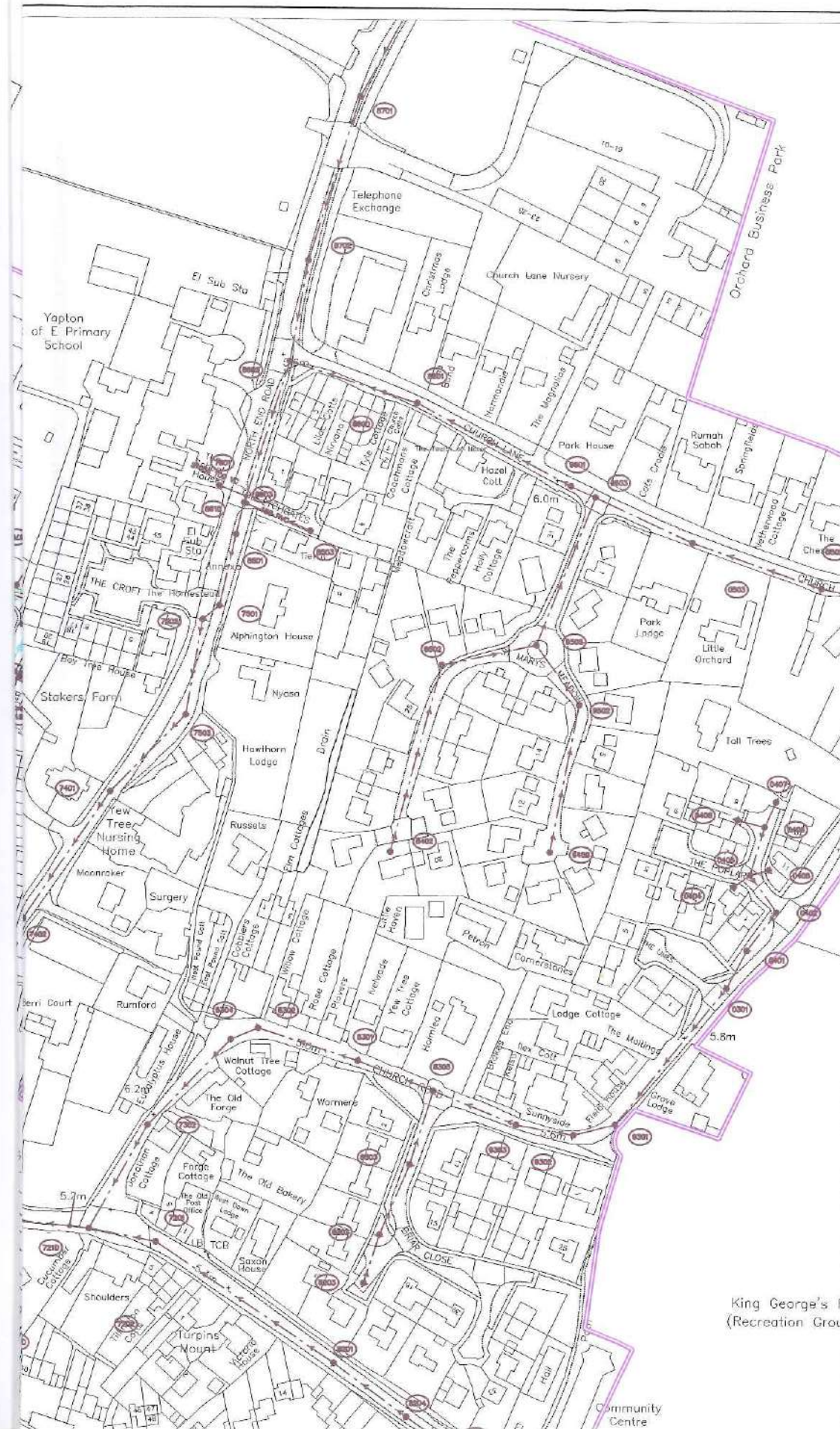
APPENDIX G

Southern Water Services Ltd (SWSL) Records





SEWER RECORDS



Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert
0003X			150	VC	CIRC	8703X		
0004X			150	VC	CIRC	8704X		
0101X	6.13	2.98	350	PF	CIRC	8708X		
0301X	5.67	4.49	175	VC	CIRC	8707X		
0401X	5.92	4.58	150	VC	CIRC	8708X		
0402X	5.8	5.03	150	VC	CIRC	8709X		
0403X	6.32	5.24	150	VC	CIRC	870DX		
0404X	6.46	5.42	150	VC	CIRC	870PX	6.35	6.34
0405X	6.55	5.38	150	VC	CIRC	8711X		
0406X	6.72	5.55	150	VC	CIRC	8712X		
0407X	7.03	5.69	150	VC	CIRC	8750X	6.17	5.04
0408X	6.82	5.6	150	VC	CIRC	878DX		
0502X	5.86	4.41	175	VC	CIRC	8801X		
0503X	5.99		175	VC	CIRC	8802X		
0702X			UNK	UNK	CIRC	8803X		
0703X			100	VC	CIRC	8901X		
0704X			100	VC	CIRC	9001X		
0705X			100	VC	CIRC	9002X		
0706X			100	VC	CIRC	9101X	6.61	3.01
0707X			100	VC	CIRC	9102X	3.22	-0.06
0708X			100	VC	CIRC	9301X	5.53	4.18
0801X	6.25	4.12	225	VC	CIRC	9302X	5.56	4.18
0804X	7.47	4.43	175	VC	CIRC	9303X	5.54	4.08
0901X	6.53	3.91	225	VC	CIRC	9402X	6.999	5.79
0902X	6.5	3.9	225	VC	CIRC	9501X	6.25	4.27
0903X	6.23	3.79	225	VC	CIRC	9502X	6.938	5.057
1701X	5.34	2.61	175	VC	CIRC	9502X	5.84	4.41
2601X	4.42	2.1	175	VC	CIRC	9503X	6.06	4.11
2701X	4.91	2.31	175	VC	CIRC	9505X	7.037	
3401X	3.95	1.25	350	PF	CIRC	9601X	6.25	3.98
3501X	3.02	1.08	350	PF	CIRC	9601X	5.99	3.24
3502X	2.58	0.9	350	PF	CIRC	9603X	6.298	
3601X	3.96	2.11	175	VC	CIRC	9701X	6.28	4.89
3602X	3.14	0.74	350	PF	CIRC	9702X	6.22	4.34
3604X	3.19	0.86	150	VC	CIRC	9709X	6.41	
3605X	3.15		225	VC	CIRC	9710X		
3605X	3.15		225	VC	CIRC	9711X		
3606X	3.42		150	VC	CIRC	9712X		
360PX	3.42	3.41	300	BAC	CIRC	9713X		
3701X	5	3.44	150	VC	CIRC	9714X		
4301X	4.78	1.72	350	PF	CIRC	9715X		
4401X	4.49	1.27	350	PF	CIRC	9716X		
4601X	4.46	2.99	150	VC	CIRC	9717X		
5101X	6.35	2.81	150	VC	CIRC	9718X		
5102X	6.42	3.06	150	VC	CIRC	9800X		
5301X	4.63	2.12	350	PF	CIRC	980DX		
5302X	4.86	2.04	350	PF	CIRC	981DX		
5303X	5.39	1.81	350	PF	CIRC			
5304X	5.33	1.81	350	PF	CIRC			
5305X	5.32	1.96	350	PF	CIRC			
6001X			UNK	UNK	CIRC			
6201X	5.19	2.63	175	VC	CIRC			
6202X	7.82	2.66	175	VC	CIRC			
6203X	4.67	2.37	350	PF	CIRC			
6204X			UNK	UNK	CIRC			
6205X			UNK	UNK	CIRC			
620DX			UNK	UNK	CIRC			
6252X	5.58	1.48	150	VC	CIRC			
6253X	5.18	3.46	150	VC	CIRC			
6254X	5.43	3.28	150	VC	CIRC			
6301X	4.63	2.37	175	VC	CIRC			
6304X	4.66	2.2	350	PF	CIRC			
6305X			100	VC	CIRC			
630DX			175	VC	CIRC			
6601X	5.09	3.25	150	VC	CIRC			
6650X	4.99	3.18	300	CP	CIRC			
6651X	5.41	4.53	150	VC	CIRC			
6701X	5.91	4.63	175	VC	CIRC			
6702X	5.68	2.9	150	VC	CIRC			
6703X	5.38	2.78	150	VC	CIRC			
6704X	5.32	2.73	150	VC	CIRC			
6705X	5.67	4.75	175	VC	CIRC			
6707X	5.57	3.11	150	VC	CIRC			
6708X	5.33	3.76	150	VC	CIRC			
6709X	5.26	3.14	150	VC	CIRC			
670PX	5.71	5.7	100	PE	CIRC			
6710X			UNK	UNK	CIRC			
6711X			100	VC	CIRC			
6712X			100	VC	CIRC			
6713X			UNK	UNK	CIRC			
6714X			UNK	UNK	CIRC			
6750X	5.95	3.71	150	VC	CIRC			
6751X	5.59	3.44	150	VC	CIRC			
6752X	5.23	3.3	225	VC	CIRC			
6753X	5.55	3.66	150	VC	CIRC			
6754X	5.34	3.78	150	VC	CIRC			
6756X			225	VC	CIRC			
6759X	4.86	2.98	300	CP	CIRC			
6760X	4.68	2.64	600	CP	CIRC			
6761X	5.33		225	VC	CIRC			
676X	2.72	2.71	600	CP	CIRC			
6801X			150	VC	CIRC			
6802X			UNK	UNK	CIRC			
6805X			UNK	UNK	CIRC			
680DX			UNK	UNK	CIRC			
7201X	5.36	2.51	350	PF	CIRC			



7402X	5.12	2.63	175	VC	CIRC	
7501X	5.75	3.23	175	VC	CIRC	
7502X	5.58	3.22	175	VC	CIRC	
7503X	5.47	3.02	175	VC	CIRC	
7601X			100	VC	CIRC	*
7601X	6.37	4.75	175	VC	CIRC	*
7602X	6.3	4.36	175	VC	CIRC	
7701X	5.48	3.9	150	VC	CIRC	
7702X	5.42	4	150	VC	CIRC	
7703X	5.96		150	VC	CIRC	
7704X	6		150	VC	CIRC	
7705X	5.92		150	VC	CIRC	
7706X			UNK	UNK	CIRC	
7707X			150	VC	CIRC	
7708X			150	VC	CIRC	
7710X			UNK	UNK	CIRC	
7711X			UNK	UNK	CIRC	
7712X			UNK	UNK	CIRC	
7713X			UNK	UNK	CIRC	
7714X			UNK	UNK	CIRC	
7715X			UNK	UNK	CIRC	
7750X	8.41	5.45	225	VC	CIRC	
7751X	5.96	4.46	225	VC	CIRC	
7752X	6.04	4.64	225	VC	CIRC	
7753X	5.95	4.81	225	VC	CIRC	
7754X	5.9	4.94	225	VC	CIRC	
7756X	5.52		225	VC	CIRC	
7801X			150	VC	CIRC	
7802X			150	VC	CIRC	
7803X			150	VC	CIRC	
7804X			UNK	VC	CIRC	
7806X			UNK	UNK	CIRC	
7807X			150	VC	CIRC	
7808X			150	VC	CIRC	
7809X			150	VC	CIRC	
7810X			150	VC	CIRC	
7811X			UNK	UNK	CIRC	
7850X			225	VC	CIRC	
7901X			UNK	UNK	CIRC	
8001X			UNK	VC	CIRC	
810DX			UNK	UNK	CIRC	
8201X	5.32	2.78	350	PF	CIRC	
8202X	7.06	4.91	150	VC	CIRC	
8203X	6.99	5.21	150	VC	CIRC	
8204X	5.45	2.86	350	PF	CIRC	
8301X	4.97	3.82	175	VC	CIRC	
8302X	5.26	3.63	175	VC	CIRC	
8303X	5.89	4.5	150	VC	CIRC	
8304X	5.39	3.58	175	VC	CIRC	
8305X	5.2	3.92	175	VC	CIRC	
8402X	7.333	6.078	150	VC	CIRC	
8501X	5.65	4.17	150	VC	CIRC	*
8501X	5.8	3.32	175	VC	CIRC	*
8502X	6.989	5.167	150	VC	CIRC	*
8502X	5.6	3.98	150	VC	CIRC	*
8503X	5.48	3.8	175	VC	CIRC	*
8503X	6.83	5.47	150	PVC	CIRC	*
8504X	5.64	4.13	150	VC	CIRC	
8601X	6.13	4.21	175	VC	CIRC	
8602X	5.57	3.56	175	VC	CIRC	*
8602X	5.37	3.67	175	VC	CIRC	*
8603X	6.03	3.67	175	VC	CIRC	*
8603X	5.52	3.6	175	VC	CIRC	*
861DX			175	VC	CIRC	
8701X	6.17	4.72	150	VC	CIRC	*
8701X	5.96	4.12	175	VC	CIRC	*
8702X	5.76	3.83	175	VC	CIRC	*
8702X			175	VC	CIRC	*

LINE STYLES / COLOURS	MATERIALS	MANHOLE / ACCESS
Brown	AK Allotment	Manhole (SW)
Red	BAC Bonded Asbestos Cement	Manhole (F&C)
Red	BRC Brick (Common)	Lamp hole (SW)
Red	BRE Brick (Engineering)	Lamp hole (F&C)
Red	CC Concrete Box Culvert	Pumping Station (SW)
Red	CI Cast Iron	Pumping Station (F&C)
Red	CO Concrete (in-Situ)	Side entry manhole (SW)
Red	CP Concrete (Pre-Cast)	Side entry Manhole (F&C)
Red	CSB Concrete Segments (bolted)	Blind shaft (SW)
Red	CSU Concrete Segments (unbolted)	Blind shaft (F&C)
Red	DI Ductile Iron	Ejector station (SW)
Orange	Building Over Agreement Area	Ejector station (F&C)
Dark Blue	Treated Effluent	Watertight door (F&C)
Purple	Sludge	Watertight door (SW)
Purple	Sewer Catchment	Flushing ch. M-e (SW)
Purple	Section 104 Area	Flushing ch. M-e (F&C)
Light Blue	Surface Water	Flushing ch. No-e (SW)
Light Blue	Surface Water Rising Main	Flushing ch. No-e (F&C)
Yellow	Private	Demarcation Chamber
Green	Access Shaft	
Green	Decommissioned	

O.S. Ref.	SU9703SW	Drawn by:	kumaria
Scale:	1:2500	Date:	16/08/201
Title: 257250_Land at B2233 Main Road			
The information contained on this plan is provided as a guide to the approximate position of existing pu cannot be guaranteed.			
THIS INFORMATION MUST BE TREATED WITH CAUTION AND THE ACTUAL POSIT SEWERS MUST BE ESTABLISHED ON SITE, IN ALL CASES.			
Southern Water must be informed before lifting manhole covers or excavating trial holes			
WARNING: BAC pipes are constructed of Bonded Asbestos Cement			
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement			
Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S Licence No. WU 298530.			

498074

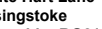
APPENDIX H

Proposed Surface Water and Foul Drainage Strategy & Micro Drainage Calculations

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- LEGEND**
- | | |
|--|--|
| | SITE BOUNDARY |
| | NON-INFILTRATING PERMEABLE PAVING WITH GRANULAR (30% VOID) SUB-BASE 800mm MIN THICKNESS |
| | NON-INFILTRATING PERMEABLE PAVING WITH GRANULAR (30% VOID) SUB-BASE 1000mm MIN THICKNESS |
| | NON-INFILTRATING CELLULAR STORAGE TANK (95% VOID) |
| | PROPOSED SURFACE WATER SEWER & MANHOLE |
| | PROPOSED 150mmØ PERFORATED PIPE LAID UNDERNEATH CELLULAR STORAGE TANK (1:150 FALL) |
| | PROPOSED DIFFUSER UNIT |
| | PROPOSED HYDROBRAKE FLOW CONTROL CHAMBER |
| | PROPOSED SURFACE WATER CATCHPIT WITH 300mm MIN SUMP |
| | PROPOSED BASIN WITH 1:3 SIDE GRADIENT |
| | PROPOSED FOUL SEWER & MANHOLE |
| | EXISTING FOUL SEWER & MANHOLE |
| | PROPOSED FLOW WATER RISING MAIN |
| | LIDAR DTM 250mm CONTOUR |

[illegible]

 **ODYSSEY**

Tuscany House
White Hart Lane
Basingstoke
Hampshire RG21 4AF

Telephone: 01256 331144
Fax: 01256 331134
E: info@odysseyconsult.co.uk
W: www.odysseyconsult.co.uk

Job Title

LAND SOUTH OF B2233 MAIN ROAD
YAPTON, WEST SUSSEX

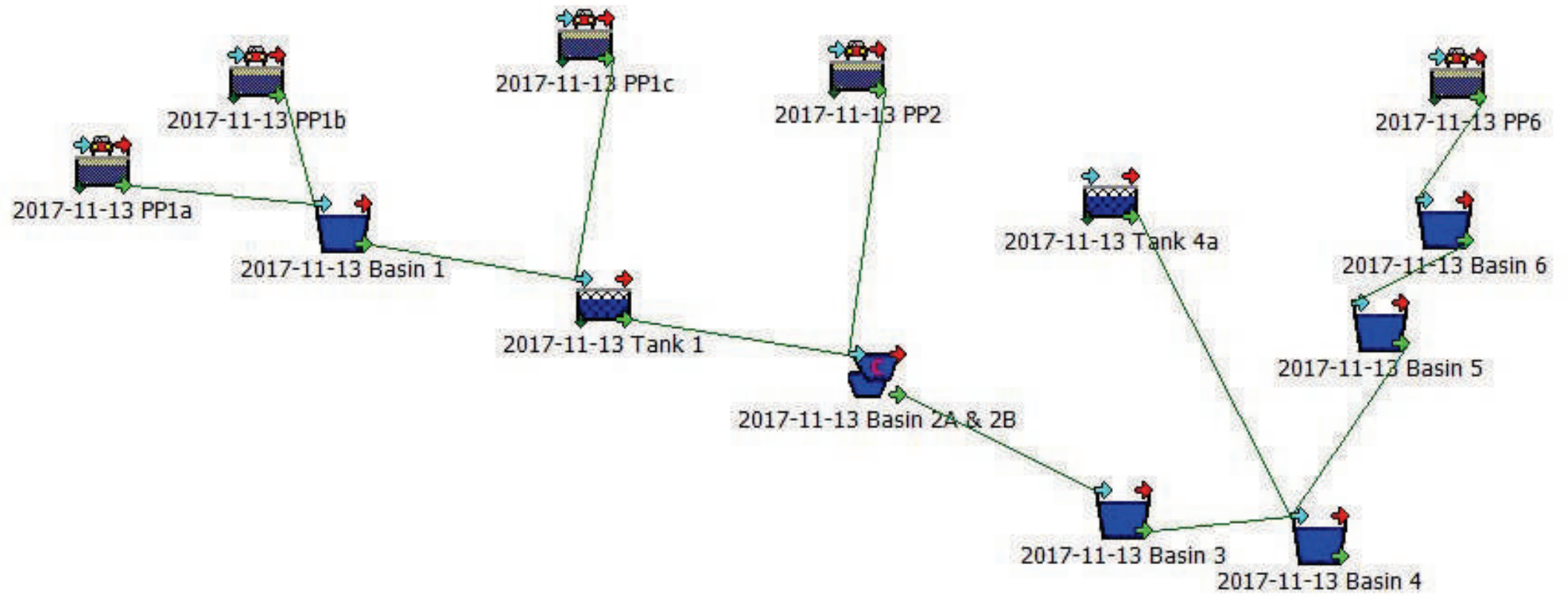
Drawing Title

PRELIMINARY
DRAINAGE STRATEGY

Client **LANDLINK ESTATES LTD**

Scale	Date	Designed
1:1000 @A1	NOV 17	JH
Drawn	Checked	Approved
CF	JH	GG
Job No	Drawing No	Rev
14-111	14-111/102	A

Odyssey Markides		Page 1
Tuscany House White Hart Lane Basingstoke RG21 4AF	Land at Drove Lane Yapton Greenfield Runoff Rates	
Date 17/11/2017 17:45 File	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 2 Soil 0.400 Area (ha) 12.300 Urban 0.000 SAAR (mm) 750 Region Number Region 7 Results l/s QBAR Rural 45.4 QBAR Urban 45.4 Q2 years 40.0 Q1 year 38.6 Q30 years 102.8 Q100 years 144.7		
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Odyssey Markides							Page 1
Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 1 PP1a				
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 PP1a.srcx</u>							
Upstream Structures			Outflow To		Overflow To		
(None)			2017-11-13 Basin 1.srcx		(None)		
Half Drain Time : 521 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
60 min Summer	5.772	0.472	0.0	1.0	1.0	37.7	O K
120 min Summer	5.830	0.530	0.0	1.0	1.0	43.8	Flood Risk
180 min Summer	5.860	0.560	0.0	1.0	1.0	47.0	Flood Risk
240 min Summer	5.876	0.576	0.0	1.0	1.0	48.7	Flood Risk
360 min Summer	5.889	0.589	0.0	1.0	1.0	50.0	Flood Risk
480 min Summer	5.888	0.588	0.0	1.0	1.0	49.9	Flood Risk
600 min Summer	5.885	0.585	0.0	1.0	1.0	49.6	Flood Risk
720 min Summer	5.880	0.580	0.0	1.0	1.0	49.1	Flood Risk
960 min Summer	5.843	0.543	0.0	1.0	1.0	45.2	Flood Risk
1440 min Summer	5.783	0.483	0.0	1.0	1.0	38.8	O K
2160 min Summer	5.697	0.397	0.0	1.0	1.0	29.8	O K
2880 min Summer	5.626	0.326	0.0	1.0	1.0	22.3	O K
4320 min Summer	5.550	0.250	0.0	1.0	1.0	14.2	O K
5760 min Summer	5.493	0.193	0.0	1.0	1.0	8.6	O K
7200 min Summer	5.448	0.148	0.0	1.0	1.0	5.0	O K
8640 min Summer	5.413	0.113	0.0	0.9	0.9	2.9	O K
10080 min Summer	5.390	0.090	0.0	0.9	0.9	1.8	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
60 min Summer	60.155	0.0	40.6	64			
120 min Summer	36.520	0.0	49.6	122			
180 min Summer	27.273	0.0	55.8	182			
240 min Summer	22.171	0.0	60.6	242			
360 min Summer	16.558	0.0	68.0	360			
480 min Summer	13.460	0.0	73.8	440			
600 min Summer	11.462	0.0	78.6	500			
720 min Summer	10.052	0.0	82.8	564			
960 min Summer	7.824	0.0	85.8	692			
1440 min Summer	5.496	0.0	90.2	966			
2160 min Summer	3.861	0.0	94.6	1360			
2880 min Summer	3.005	0.0	97.8	1728			
4320 min Summer	2.244	0.0	109.0	2424			
5760 min Summer	1.824	0.0	117.5	3120			
7200 min Summer	1.554	0.0	124.4	3816			
8640 min Summer	1.362	0.0	130.2	4488			
10080 min Summer	1.219	0.0	135.3	5144			
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Odyssey Markides							Page 2
Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 1 PP1a				
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 PP1a.srcx</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	5.820	0.520	0.0	1.0	1.0	42.8	Flood Risk
120 min Winter	5.888	0.588	0.0	1.0	1.0	50.0	Flood Risk
180 min Winter	5.925	0.625	0.0	1.0	1.0	53.8	Flood Risk
240 min Winter	5.946	0.646	0.0	1.0	1.0	56.1	Flood Risk
360 min Winter	5.967	0.667	0.0	1.0	1.0	58.3	Flood Risk
480 min Winter	5.972	0.672	0.0	1.0	1.0	58.8	Flood Risk
600 min Winter	5.968	0.668	0.0	1.0	1.0	58.3	Flood Risk
720 min Winter	5.960	0.660	0.0	1.0	1.0	57.5	Flood Risk
960 min Winter	5.914	0.614	0.0	1.0	1.0	52.7	Flood Risk
1440 min Winter	5.832	0.532	0.0	1.0	1.0	44.1	Flood Risk
2160 min Winter	5.711	0.411	0.0	1.0	1.0	31.2	O K
2880 min Winter	5.603	0.303	0.0	1.0	1.0	19.9	O K
4320 min Winter	5.493	0.193	0.0	1.0	1.0	8.5	O K
5760 min Winter	5.416	0.116	0.0	0.9	0.9	3.1	O K
7200 min Winter	5.375	0.075	0.0	0.8	0.8	1.3	O K
8640 min Winter	5.364	0.064	0.0	0.7	0.7	0.9	O K
10080 min Winter	5.356	0.056	0.0	0.7	0.7	0.7	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
60 min Winter	60.155	0.0	45.7	62			
120 min Winter	36.520	0.0	55.8	120			
180 min Winter	27.273	0.0	62.7	178			
240 min Winter	22.171	0.0	68.1	236			
360 min Winter	16.558	0.0	76.4	348			
480 min Winter	13.460	0.0	82.9	458			
600 min Winter	11.462	0.0	88.3	560			
720 min Winter	10.052	0.0	93.0	592			
960 min Winter	7.824	0.0	96.4	734			
1440 min Winter	5.496	0.0	101.3	1040			
2160 min Winter	3.861	0.0	106.4	1472			
2880 min Winter	3.005	0.0	110.0	1820			
4320 min Winter	2.244	0.0	122.7	2504			
5760 min Winter	1.824	0.0	132.3	3104			
7200 min Winter	1.554	0.0	140.2	3672			
8640 min Winter	1.362	0.0	146.9	4376			
10080 min Winter	1.219	0.0	152.6	5088			
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Odyssey Markides		Page 3
Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 1 PP1a	
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Rainfall Details for 2017-11-13 PP1a.srcx

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location GB 497050 103400 SU 97050 03400	
C (1km)	-0.025
D1 (1km)	0.395
D2 (1km)	0.244
D3 (1km)	0.395
E (1km)	0.309
F (1km)	2.339
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.094

Time (mins)	Area
From:	To: (ha)
0	4 0.094

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Odyssey Markides		Page 4
Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 1 PP1a	
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 PP1a.srcx

Storage is Online Cover Level (m) 6.100

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.1
Membrane Percolation (mm/hr)	1000	Length (m)	69.0
Max Percolation (l/s)	97.8	Slope (1:X)	300.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.300	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0051-1000-0670-1000
Design Head (m)	0.670
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	51
Invert Level (m)	5.300
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.670	1.0
Flush-Flo™	0.214	1.0
Kick-Flo®	0.434	0.8
Mean Flow over Head Range	-	0.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.9	1.200	1.3	3.000	2.0	7.000	2.9
0.200	1.0	1.400	1.4	3.500	2.1	7.500	3.0
0.300	1.0	1.600	1.5	4.000	2.2	8.000	3.1
0.400	0.9	1.800	1.6	4.500	2.4	8.500	3.2
0.500	0.9	2.000	1.6	5.000	2.5	9.000	3.3
0.600	1.0	2.200	1.7	5.500	2.6	9.500	3.4
0.800	1.1	2.400	1.8	6.000	2.7		
1.000	1.2	2.600	1.8	6.500	2.8		

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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 1 PP1b																																																																																																																																																																																																																																										
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG																																																																																																																																																																																																																																										
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<u>Cascade Summary of Results for 2017-11-13 PP1b.srcx</u> <table><tr><td>Upstream Structures</td><td>Outflow To</td><td>Overflow To</td></tr><tr><td>(None)</td><td>2017-11-13 Basin 1.srcx</td><td>(None)</td></tr><tr><td colspan="3">Half Drain Time : 151 minutes.</td></tr><tr><td colspan="3">Outflow is too low. Design is unsatisfactory.</td></tr></table> <table><tr><td>Storm Event</td><td>Max Level (m)</td><td>Max Depth (m)</td><td>Max Infiltration (l/s)</td><td>Max Control (l/s)</td><td>Max E (l/s)</td><td>Max Outflow Volume (m³)</td><td>Status</td></tr><tr><td>60 min Summer</td><td>5.480</td><td>0.280</td><td>0.0</td><td>1.0</td><td>1.0</td><td>13.0</td><td>O K</td></tr><tr><td>120 min Summer</td><td>5.493</td><td>0.293</td><td>0.0</td><td>1.0</td><td>1.0</td><td>13.8</td><td>O K</td></tr><tr><td>180 min Summer</td><td>5.493</td><td>0.293</td><td>0.0</td><td>1.0</td><td>1.0</td><td>13.8</td><td>O K</td></tr><tr><td>240 min Summer</td><td>5.490</td><td>0.290</td><td>0.0</td><td>1.0</td><td>1.0</td><td>13.6</td><td>O K</td></tr><tr><td>360 min Summer</td><td>5.481</td><td>0.281</td><td>0.0</td><td>1.0</td><td>1.0</td><td>13.1</td><td>O K</td></tr><tr><td>480 min Summer</td><td>5.471</td><td>0.271</td><td>0.0</td><td>1.0</td><td>1.0</td><td>12.4</td><td>O K</td></tr><tr><td>600 min Summer</td><td>5.459</td><td>0.259</td><td>0.0</td><td>1.0</td><td>1.0</td><td>11.7</td><td>O K</td></tr><tr><td>720 min Summer</td><td>5.447</td><td>0.247</td><td>0.0</td><td>1.0</td><td>1.0</td><td>11.0</td><td>O K</td></tr><tr><td>960 min Summer</td><td>5.405</td><td>0.205</td><td>0.0</td><td>1.0</td><td>1.0</td><td>8.4</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>5.343</td><td>0.143</td><td>0.0</td><td>1.0</td><td>1.0</td><td>4.6</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>5.286</td><td>0.086</td><td>0.0</td><td>1.0</td><td>1.0</td><td>1.7</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>5.265</td><td>0.065</td><td>0.0</td><td>0.9</td><td>0.9</td><td>0.9</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>5.250</td><td>0.050</td><td>0.0</td><td>0.7</td><td>0.7</td><td>0.6</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>5.242</td><td>0.042</td><td>0.0</td><td>0.5</td><td>0.5</td><td>0.4</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>5.238</td><td>0.038</td><td>0.0</td><td>0.5</td><td>0.5</td><td>0.3</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>5.235</td><td>0.035</td><td>0.0</td><td>0.4</td><td>0.4</td><td>0.3</td><td>O K</td></tr></table> <table><tr><td>Storm Event</td><td>Rain (mm/hr)</td><td>Flooded Volume (m³)</td><td>Discharge Volume (m³)</td><td>Time-Peak (mins)</td></tr><tr><td>60 min Summer</td><td>60.155</td><td>0.0</td><td>15.6</td><td>62</td></tr><tr><td>120 min Summer</td><td>36.520</td><td>0.0</td><td>19.2</td><td>118</td></tr><tr><td>180 min Summer</td><td>27.273</td><td>0.0</td><td>21.6</td><td>146</td></tr><tr><td>240 min Summer</td><td>22.171</td><td>0.0</td><td>23.5</td><td>178</td></tr><tr><td>360 min Summer</td><td>16.558</td><td>0.0</td><td>26.4</td><td>248</td></tr><tr><td>480 min Summer</td><td>13.460</td><td>0.0</td><td>28.7</td><td>318</td></tr><tr><td>600 min Summer</td><td>11.462</td><td>0.0</td><td>30.5</td><td>386</td></tr><tr><td>720 min Summer</td><td>10.052</td><td>0.0</td><td>32.1</td><td>456</td></tr><tr><td>960 min Summer</td><td>7.824</td><td>0.0</td><td>33.3</td><td>580</td></tr><tr><td>1440 min Summer</td><td>5.496</td><td>0.0</td><td>35.0</td><td>810</td></tr><tr><td>2160 min Summer</td><td>3.861</td><td>0.0</td><td>36.6</td><td>1128</td></tr><tr><td>2880 min Summer</td><td>3.005</td><td>0.0</td><td>37.8</td><td>1468</td></tr><tr><td>4320 min Summer</td><td>2.244</td><td>0.0</td><td>42.0</td><td>2196</td></tr><tr><td>5760 min Summer</td><td>1.824</td><td>0.0</td><td>45.1</td><td>2936</td></tr><tr><td>7200 min Summer</td><td>1.554</td><td>0.0</td><td>47.6</td><td>3584</td></tr><tr><td>8640 min Summer</td><td>1.362</td><td>0.0</td><td>49.7</td><td>4344</td></tr></table>			Upstream Structures	Outflow To	Overflow To	(None)	2017-11-13 Basin 1.srcx	(None)	Half Drain Time : 151 minutes.			Outflow is too low. Design is unsatisfactory.			Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E (l/s)	Max Outflow Volume (m³)	Status	60 min Summer	5.480	0.280	0.0	1.0	1.0	13.0	O K	120 min Summer	5.493	0.293	0.0	1.0	1.0	13.8	O K	180 min Summer	5.493	0.293	0.0	1.0	1.0	13.8	O K	240 min Summer	5.490	0.290	0.0	1.0	1.0	13.6	O K	360 min Summer	5.481	0.281	0.0	1.0	1.0	13.1	O K	480 min Summer	5.471	0.271	0.0	1.0	1.0	12.4	O K	600 min Summer	5.459	0.259	0.0	1.0	1.0	11.7	O K	720 min Summer	5.447	0.247	0.0	1.0	1.0	11.0	O K	960 min Summer	5.405	0.205	0.0	1.0	1.0	8.4	O K	1440 min Summer	5.343	0.143	0.0	1.0	1.0	4.6	O K	2160 min Summer	5.286	0.086	0.0	1.0	1.0	1.7	O K	2880 min Summer	5.265	0.065	0.0	0.9	0.9	0.9	O K	4320 min Summer	5.250	0.050	0.0	0.7	0.7	0.6	O K	5760 min Summer	5.242	0.042	0.0	0.5	0.5	0.4	O K	7200 min Summer	5.238	0.038	0.0	0.5	0.5	0.3	O K	8640 min Summer	5.235	0.035	0.0	0.4	0.4	0.3	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	60 min Summer	60.155	0.0	15.6	62	120 min Summer	36.520	0.0	19.2	118	180 min Summer	27.273	0.0	21.6	146	240 min Summer	22.171	0.0	23.5	178	360 min Summer	16.558	0.0	26.4	248	480 min Summer	13.460	0.0	28.7	318	600 min Summer	11.462	0.0	30.5	386	720 min Summer	10.052	0.0	32.1	456	960 min Summer	7.824	0.0	33.3	580	1440 min Summer	5.496	0.0	35.0	810	2160 min Summer	3.861	0.0	36.6	1128	2880 min Summer	3.005	0.0	37.8	1468	4320 min Summer	2.244	0.0	42.0	2196	5760 min Summer	1.824	0.0	45.1	2936	7200 min Summer	1.554	0.0	47.6	3584	8640 min Summer	1.362	0.0	49.7	4344
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Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 1 PP1b				
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 PP1b.srcx</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	5.233	0.033	0.0	0.4	0.4	0.2	O K
60 min Winter	5.511	0.311	0.0	1.0	1.0	14.9	Flood Risk
120 min Winter	5.530	0.330	0.0	1.0	1.0	16.1	Flood Risk
180 min Winter	5.530	0.330	0.0	1.0	1.0	16.1	Flood Risk
240 min Winter	5.526	0.326	0.0	1.0	1.0	15.8	Flood Risk
360 min Winter	5.512	0.312	0.0	1.0	1.0	15.0	Flood Risk
480 min Winter	5.495	0.295	0.0	1.0	1.0	13.9	O K
600 min Winter	5.477	0.277	0.0	1.0	1.0	12.8	O K
720 min Winter	5.457	0.257	0.0	1.0	1.0	11.6	O K
960 min Winter	5.395	0.195	0.0	1.0	1.0	7.8	O K
1440 min Winter	5.307	0.107	0.0	1.0	1.0	2.6	O K
2160 min Winter	5.261	0.061	0.0	0.8	0.8	0.8	O K
2880 min Winter	5.248	0.048	0.0	0.6	0.6	0.5	O K
4320 min Winter	5.239	0.039	0.0	0.5	0.5	0.3	O K
5760 min Winter	5.234	0.034	0.0	0.4	0.4	0.3	O K
7200 min Winter	5.231	0.031	0.0	0.3	0.3	0.2	O K
8640 min Winter	5.229	0.029	0.0	0.3	0.3	0.2	O K
10080 min Winter	5.227	0.027	0.0	0.3	0.3	0.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
10080 min Summer	1.219	0.0	51.5	5064			
60 min Winter	60.155	0.0	17.6	60			
120 min Winter	36.520	0.0	21.6	116			
180 min Winter	27.273	0.0	24.3	166			
240 min Winter	22.171	0.0	26.4	190			
360 min Winter	16.558	0.0	29.7	268			
480 min Winter	13.460	0.0	32.2	344			
600 min Winter	11.462	0.0	34.3	420			
720 min Winter	10.052	0.0	36.2	494			
960 min Winter	7.824	0.0	37.5	618			
1440 min Winter	5.496	0.0	39.4	822			
2160 min Winter	3.861	0.0	41.3	1104			
2880 min Winter	3.005	0.0	42.6	1468			
4320 min Winter	2.244	0.0	47.4	2200			
5760 min Winter	1.824	0.0	51.0	2880			
7200 min Winter	1.554	0.0	53.9	3680			
8640 min Winter	1.362	0.0	56.3	4384			
10080 min Winter	1.219	0.0	58.4	5000			
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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 1 PP1b	
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XP Solutions Source Control 2017.1.2		

Cascade Rainfall Details for 2017-11-13 PP1b.srcx

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 497050 103400 SU 97050 03400
C (1km)	-0.025
D1 (1km)	0.395
D2 (1km)	0.244
D3 (1km)	0.395
E (1km)	0.309
F (1km)	2.339
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.037

Time (mins)	Area
From:	To: (ha)
0	4 0.037

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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 1 PP1b	
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 PP1b.srcx

Storage is Online Cover Level (m) 5.800

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	41.0
Max Percolation (l/s)	56.9	Slope (1:X)	300.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.200	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0056-1000-0330-1000
Design Head (m)	0.330
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	56
Invert Level (m)	5.200
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.330	1.0
Flush-Flo™	0.096	1.0
Kick-Flo®	0.233	0.9
Mean Flow over Head Range	-	0.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	1.200	1.8	3.000	2.7	7.000	4.1
0.200	0.9	1.400	1.9	3.500	2.9	7.500	4.3
0.300	1.0	1.600	2.0	4.000	3.1	8.000	4.4
0.400	1.1	1.800	2.1	4.500	3.3	8.500	4.5
0.500	1.2	2.000	2.3	5.000	3.5	9.000	4.7
0.600	1.3	2.200	2.4	5.500	3.7	9.500	4.8
0.800	1.5	2.400	2.4	6.000	3.8		
1.000	1.6	2.600	2.5	6.500	4.0		

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Tuscany House White Hart Lane Basingstoke RG21 4AF		14-111 Drove Lane Yapton Catchment 1 PP1c					
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx		Designed by JH Checked by GG					
XP Solutions		Source Control 2017.1.2					
Cascade Summary of Results for 2017-11-13 PP1c.srcx							
Upstream Structures		Outflow To					
(None)		2017-11-13 Tank 1.srcx					
Overflow To		(None)					
Half Drain Time : 283 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
60 min Summer	5.129	0.329	0.0	1.0	1.0	22.1	Flood Risk
120 min Summer	5.154	0.354	0.0	1.0	1.0	24.9	Flood Risk
180 min Summer	5.163	0.363	0.0	1.0	1.0	25.9	Flood Risk
240 min Summer	5.165	0.365	0.0	1.0	1.0	26.0	Flood Risk
360 min Summer	5.163	0.363	0.0	1.0	1.0	25.8	Flood Risk
480 min Summer	5.158	0.358	0.0	1.0	1.0	25.4	Flood Risk
600 min Summer	5.153	0.353	0.0	1.0	1.0	24.8	Flood Risk
720 min Summer	5.148	0.348	0.0	1.0	1.0	24.2	Flood Risk
960 min Summer	5.122	0.322	0.0	1.0	1.0	21.3	Flood Risk
1440 min Summer	5.073	0.273	0.0	1.0	1.0	16.0	Flood Risk
2160 min Summer	5.008	0.208	0.0	1.0	1.0	9.3	Flood Risk
2880 min Summer	4.951	0.151	0.0	1.0	1.0	4.9	O K
4320 min Summer	4.887	0.087	0.0	1.0	1.0	1.6	O K
5760 min Summer	4.866	0.066	0.0	0.9	0.9	0.9	O K
7200 min Summer	4.855	0.055	0.0	0.7	0.7	0.7	O K
8640 min Summer	4.849	0.049	0.0	0.6	0.6	0.5	O K
10080 min Summer	4.845	0.045	0.0	0.6	0.6	0.4	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
60 min Summer	60.155	0.0	24.7	62			
120 min Summer	36.520	0.0	30.4	122			
180 min Summer	27.273	0.0	34.2	180			
240 min Summer	22.171	0.0	37.2	226			
360 min Summer	16.558	0.0	41.9	286			
480 min Summer	13.460	0.0	45.5	350			
600 min Summer	11.462	0.0	48.4	420			
720 min Summer	10.052	0.0	51.0	490			
960 min Summer	7.824	0.0	52.8	626			
1440 min Summer	5.496	0.0	55.5	894			
2160 min Summer	3.861	0.0	58.0	1252			
2880 min Summer	3.005	0.0	59.8	1584			
4320 min Summer	2.244	0.0	66.4	2208			
5760 min Summer	1.824	0.0	71.3	2936			
7200 min Summer	1.554	0.0	75.2	3672			
8640 min Summer	1.362	0.0	78.4	4360			
10080 min Summer	1.219	0.0	81.2	5088			
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Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 1 PP1c				
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 PP1c.srcx</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	5.157	0.357	0.0	1.0	1.0	25.2	Flood Risk
120 min Winter	5.189	0.389	0.0	1.0	1.0	28.7	Flood Risk
180 min Winter	5.202	0.402	0.0	1.0	1.0	30.1	Flood Risk
240 min Winter	5.206	0.406	0.0	1.0	1.0	30.6	Flood Risk
360 min Winter	5.203	0.403	0.0	1.0	1.0	30.2	Flood Risk
480 min Winter	5.197	0.397	0.0	1.0	1.0	29.6	Flood Risk
600 min Winter	5.190	0.390	0.0	1.0	1.0	28.8	Flood Risk
720 min Winter	5.181	0.381	0.0	1.0	1.0	27.8	Flood Risk
960 min Winter	5.144	0.344	0.0	1.0	1.0	23.7	Flood Risk
1440 min Winter	5.072	0.272	0.0	1.0	1.0	15.9	Flood Risk
2160 min Winter	4.970	0.170	0.0	1.0	1.0	6.3	O K
2880 min Winter	4.887	0.087	0.0	1.0	1.0	1.6	O K
4320 min Winter	4.858	0.058	0.0	0.8	0.8	0.7	O K
5760 min Winter	4.848	0.048	0.0	0.6	0.6	0.5	O K
7200 min Winter	4.842	0.042	0.0	0.5	0.5	0.4	O K
8640 min Winter	4.839	0.039	0.0	0.5	0.5	0.3	O K
10080 min Winter	4.836	0.036	0.0	0.4	0.4	0.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
60 min Winter	60.155	0.0	27.9	62			
120 min Winter	36.520	0.0	34.3	118			
180 min Winter	27.273	0.0	38.6	176			
240 min Winter	22.171	0.0	41.9	230			
360 min Winter	16.558	0.0	47.1	326			
480 min Winter	13.460	0.0	51.2	374			
600 min Winter	11.462	0.0	54.5	452			
720 min Winter	10.052	0.0	57.4	530			
960 min Winter	7.824	0.0	59.5	682			
1440 min Winter	5.496	0.0	62.5	966			
2160 min Winter	3.861	0.0	65.4	1296			
2880 min Winter	3.005	0.0	67.5	1532			
4320 min Winter	2.244	0.0	75.0	2204			
5760 min Winter	1.824	0.0	80.6	2872			
7200 min Winter	1.554	0.0	85.2	3672			
8640 min Winter	1.362	0.0	88.9	4360			
10080 min Winter	1.219	0.0	92.1	5000			
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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 1 PP1c	
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 PP1c.srcx

Storage is Online Cover Level (m) 5.300

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	76.0
Max Percolation (l/s)	101.3	Slope (1:X)	300.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.800	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0055-1000-0410-1000
Design Head (m)	0.410
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	55
Invert Level (m)	4.800
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.410	1.0
Flush-Flo™	0.120	1.0
Kick-Flo®	0.278	0.8
Mean Flow over Head Range	-	0.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	1.200	1.6	3.000	2.5	7.000	3.7
0.200	1.0	1.400	1.7	3.500	2.6	7.500	3.8
0.300	0.9	1.600	1.8	4.000	2.8	8.000	4.0
0.400	1.0	1.800	1.9	4.500	3.0	8.500	4.1
0.500	1.1	2.000	2.0	5.000	3.1	9.000	4.2
0.600	1.2	2.200	2.1	5.500	3.3	9.500	4.3
0.800	1.3	2.400	2.2	6.000	3.4		
1.000	1.5	2.600	2.3	6.500	3.6		

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Tuscany House White Hart Lane Basingstoke RG21 4AF		14-111 Drove Lane Yapton Catchment 1 Tank 1					
Date 17/11/2017 17:13 File 2017-11-16 Cascade.casx		Designed by JH Checked by GG					
XP Solutions		Source Control 2017.1.2					
<u>Cascade Summary of Results for 2017-11-13 Tank 1.srcx</u>							
Upstream Structures		Outflow To		Overflow To			
2017-11-13 Basin 1.srcx 2017-11-13 PP1a.srcx 2017-11-13 PP1b.srcx 2017-11-13 PP1c.srcx		2017-11-13 Basin 2A & 2B.srcx		(None)			
Half Drain Time : 108 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Summer	4.830	0.260	0.0	10.8	10.8	61.4	O K
120 min Summer	4.900	0.330	0.0	10.8	10.8	77.8	O K
180 min Summer	4.950	0.380	0.0	10.8	10.8	89.5	O K
240 min Summer	5.003	0.433	0.0	10.8	10.8	101.9	O K
360 min Summer	5.079	0.509	0.0	10.8	10.8	119.9	O K
480 min Summer	5.093	0.523	0.0	10.8	10.8	123.2	O K
600 min Summer	5.100	0.530	0.0	10.8	10.8	124.8	O K
720 min Summer	5.104	0.534	0.0	10.8	10.8	125.8	O K
960 min Summer	5.105	0.535	0.0	10.8	10.8	126.1	O K
1440 min Summer	5.099	0.529	0.0	10.8	10.8	124.7	O K
2160 min Summer	5.025	0.455	0.0	10.8	10.8	107.3	O K
2880 min Summer	4.896	0.326	0.0	10.8	10.8	76.9	O K
4320 min Summer	4.761	0.191	0.0	10.7	10.7	44.9	O K
5760 min Summer	4.720	0.150	0.0	9.7	9.7	35.4	O K
7200 min Summer	4.704	0.134	0.0	8.5	8.5	31.5	O K
8640 min Summer	4.692	0.122	0.0	7.6	7.6	28.9	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
60 min Summer	60.155	0.0	310.6	64			
120 min Summer	36.520	0.0	378.2	124			
180 min Summer	27.273	0.0	424.2	208			
240 min Summer	22.171	0.0	460.1	556			
360 min Summer	16.558	0.0	515.8	648			
480 min Summer	13.460	0.0	559.3	730			
600 min Summer	11.462	0.0	595.5	810			
720 min Summer	10.052	0.0	626.7	886			
960 min Summer	7.824	0.0	650.1	998			
1440 min Summer	5.496	0.0	684.2	1128			
2160 min Summer	3.861	0.0	721.4	1388			
2880 min Summer	3.005	0.0	747.5	1652			
4320 min Summer	2.244	0.0	835.3	2288			
5760 min Summer	1.824	0.0	904.8	2952			
7200 min Summer	1.554	0.0	961.3	3672			
8640 min Summer	1.362	0.0	1009.6	4408			
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Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 1 Tank 1				
Date 17/11/2017 17:13 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 Tank 1.srcx</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	4.684	0.114	0.0	6.9	6.9	26.9	O K
60 min Winter	4.859	0.289	0.0	10.8	10.8	68.2	O K
120 min Winter	4.942	0.372	0.0	10.8	10.8	87.6	O K
180 min Winter	5.053	0.483	0.0	10.8	10.8	113.7	O K
240 min Winter	5.088	0.518	0.0	10.8	10.8	122.1	O K
360 min Winter	5.113	0.543	0.0	10.8	10.8	128.0	O K
480 min Winter	5.139	0.569	0.0	10.8	10.8	134.0	O K
600 min Winter	5.152	0.582	0.0	10.8	10.8	137.2	O K
720 min Winter	5.155	0.585	0.0	10.8	10.8	137.8	O K
960 min Winter	5.135	0.565	0.0	10.8	10.8	133.2	O K
1440 min Winter	5.161	0.591	0.0	10.8	10.8	139.2	O K
2160 min Winter	4.988	0.418	0.0	10.8	10.8	98.4	O K
2880 min Winter	4.774	0.204	0.0	10.7	10.7	48.1	O K
4320 min Winter	4.709	0.139	0.0	8.9	8.9	32.7	O K
5760 min Winter	4.690	0.120	0.0	7.4	7.4	28.3	O K
7200 min Winter	4.679	0.109	0.0	6.4	6.4	25.6	O K
8640 min Winter	4.670	0.100	0.0	5.6	5.6	23.6	O K
10080 min Winter	4.663	0.093	0.0	5.0	5.0	22.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
10080 min Summer	1.219	0.0	1051.8	5136			
60 min Winter	60.155	0.0	348.5	64			
120 min Winter	36.520	0.0	424.2	188			
180 min Winter	27.273	0.0	475.7	556			
240 min Winter	22.171	0.0	516.0	610			
360 min Winter	16.558	0.0	578.4	704			
480 min Winter	13.460	0.0	627.1	484			
600 min Winter	11.462	0.0	667.7	594			
720 min Winter	10.052	0.0	702.7	700			
960 min Winter	7.824	0.0	728.9	1054			
1440 min Winter	5.496	0.0	767.1	1158			
2160 min Winter	3.861	0.0	809.1	1376			
2880 min Winter	3.005	0.0	838.6	1616			
4320 min Winter	2.244	0.0	937.3	2244			
5760 min Winter	1.824	0.0	1015.4	2944			
7200 min Winter	1.554	0.0	1079.0	3672			
8640 min Winter	1.362	0.0	1133.6	4400			
10080 min Winter	1.219	0.0	1181.3	5144			
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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 1 Tank 1	
Date 17/11/2017 17:13 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 Tank 1.srcx

Storage is Online Cover Level (m) 5.670

Cellular Storage Structure

Invert Level (m) 4.570 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	248.0	248.0	0.700	0.0	294.8
0.600	248.0	294.8			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0156-1080-0600-1080
Design Head (m) 0.600
Design Flow (l/s) 10.8
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 156
Invert Level (m) 4.570
Minimum Outlet Pipe Diameter (mm) 225
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	10.8
Flush-Flo™	0.242	10.8
Kick-Flo®	0.459	9.5
Mean Flow over Head Range	-	8.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.6	1.200	15.0	3.000	23.2	7.000	34.8
0.200	10.7	1.400	16.1	3.500	25.0	7.500	36.1
0.300	10.7	1.600	17.2	4.000	26.7	8.000	37.3
0.400	10.2	1.800	18.2	4.500	28.2	8.500	38.4
0.500	9.9	2.000	19.1	5.000	29.7	9.000	39.5
0.600	10.8	2.200	20.0	5.500	31.1	9.500	40.6
0.800	12.4	2.400	20.9	6.000	32.4		
1.000	13.7	2.600	21.7	6.500	33.5		

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Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 1 Basin 1			
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG			
XP Solutions			Source Control 2017.1.2			
<u>Cascade Summary of Results for 2017-11-13 Basin 1.srcx</u>						
Upstream Structures			Outflow To		Overflow To	
2017-11-13 PPl.a.srcx 2017-11-13 PPl.b.srcx			2017-11-13 Tank 1.srcx		(None)	
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Summer		5.542	0.732	10.0	153.7	Flood Risk
120 min Summer		5.590	0.780	10.0	168.4	Flood Risk
180 min Summer		5.600	0.790	10.0	171.5	Flood Risk
240 min Summer		5.601	0.791	10.0	171.7	Flood Risk
360 min Summer		5.593	0.783	10.0	169.3	Flood Risk
480 min Summer		5.580	0.770	10.0	165.2	Flood Risk
600 min Summer		5.564	0.754	10.0	160.4	Flood Risk
720 min Summer		5.547	0.737	10.0	155.3	Flood Risk
960 min Summer		5.477	0.667	10.0	135.0	O K
1440 min Summer		5.320	0.510	10.0	94.1	O K
2160 min Summer		5.133	0.323	10.0	53.0	O K
2880 min Summer		5.014	0.204	9.9	31.1	O K
4320 min Summer		4.955	0.145	8.6	21.2	O K
5760 min Summer		4.934	0.124	7.3	18.0	O K
7200 min Summer		4.922	0.112	6.3	16.1	O K
8640 min Summer		4.914	0.104	5.7	14.8	O K
10080 min Summer		4.908	0.098	5.1	13.8	O K
60 min Winter		5.608	0.798	10.0	174.1	Flood Risk
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Summer		60.155	0.0	231.6	62	
120 min Summer		36.520	0.0	281.7	120	
180 min Summer		27.273	0.0	315.9	170	
240 min Summer		22.171	0.0	342.6	198	
360 min Summer		16.558	0.0	384.0	264	
480 min Summer		13.460	0.0	416.3	332	
600 min Summer		11.462	0.0	443.3	404	
720 min Summer		10.052	0.0	466.5	472	
960 min Summer		7.824	0.0	484.0	608	
1440 min Summer		5.496	0.0	509.6	864	
2160 min Summer		3.861	0.0	536.7	1192	
2880 min Summer		3.005	0.0	556.3	1504	
4320 min Summer		2.244	0.0	622.1	2204	
5760 min Summer		1.824	0.0	673.5	2936	
7200 min Summer		1.554	0.0	715.9	3672	
8640 min Summer		1.362	0.0	752.2	4400	
10080 min Summer		1.219	0.0	784.2	5120	
60 min Winter		60.155	0.0	259.7	62	
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Tuscany House White Hart Lane Basingstoke RG21 4AF		14-111 Drove Lane Yapton Catchment 1 Basin 1			
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx		Designed by JH Checked by GG			
XP Solutions		Source Control 2017.1.2			
<u>Cascade Summary of Results for 2017-11-13 Basin 1.srcx</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
120 min Winter	5.667	0.857	10.0	193.2	Flood Risk
180 min Winter	5.684	0.874	10.1	198.8	Flood Risk
240 min Winter	5.684	0.874	10.1	198.9	Flood Risk
360 min Winter	5.672	0.862	10.1	195.0	Flood Risk
480 min Winter	5.653	0.843	10.0	188.7	Flood Risk
600 min Winter	5.629	0.819	10.0	180.9	Flood Risk
720 min Winter	5.603	0.793	10.0	172.4	Flood Risk
960 min Winter	5.506	0.696	10.0	143.2	O K
1440 min Winter	5.269	0.459	10.0	82.1	O K
2160 min Winter	5.012	0.202	9.8	30.7	O K
2880 min Winter	4.952	0.142	8.5	20.8	O K
4320 min Winter	4.926	0.116	6.6	16.6	O K
5760 min Winter	4.912	0.102	5.5	14.5	O K
7200 min Winter	4.903	0.093	4.8	13.2	O K
8640 min Winter	4.896	0.086	4.2	12.1	O K
10080 min Winter	4.890	0.080	3.7	11.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
120 min Winter	36.520	0.0	315.9	118	
180 min Winter	27.273	0.0	354.2	174	
240 min Winter	22.171	0.0	384.1	224	
360 min Winter	16.558	0.0	430.5	280	
480 min Winter	13.460	0.0	466.7	358	
600 min Winter	11.462	0.0	496.9	436	
720 min Winter	10.052	0.0	522.9	512	
960 min Winter	7.824	0.0	542.5	664	
1440 min Winter	5.496	0.0	571.2	908	
2160 min Winter	3.861	0.0	601.7	1188	
2880 min Winter	3.005	0.0	623.8	1472	
4320 min Winter	2.244	0.0	697.8	2200	
5760 min Winter	1.824	0.0	755.5	2920	
7200 min Winter	1.554	0.0	803.2	3648	
8640 min Winter	1.362	0.0	844.1	4408	
10080 min Winter	1.219	0.0	880.2	5136	
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Odyssey Markides		Page 3																																								
Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 1 Basin 1																																									
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG																																									
XP Solutions Source Control 2017.1.2																																										
<u>Cascade Rainfall Details for 2017-11-13 Basin 1.srcx</u> <table> <tr> <td>Rainfall Model</td> <td>FEH</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>FEH Rainfall Version</td> <td>1999</td> </tr> <tr> <td>Site Location</td> <td>GB 497050 103400 SU 97050 03400</td> </tr> <tr> <td>C (1km)</td> <td>-0.025</td> </tr> <tr> <td>D1 (1km)</td> <td>0.395</td> </tr> <tr> <td>D2 (1km)</td> <td>0.244</td> </tr> <tr> <td>D3 (1km)</td> <td>0.395</td> </tr> <tr> <td>E (1km)</td> <td>0.309</td> </tr> <tr> <td>F (1km)</td> <td>2.339</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> </tr> <tr> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>Shortest Storm (mins)</td> <td>60</td> </tr> <tr> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Climate Change %</td> <td>+40</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 0.389 <table> <tr> <td>Time (mins)</td> <td>Area</td> </tr> <tr> <td>From: To:</td> <td>(ha)</td> </tr> <tr> <td>0</td> <td>4 0.389</td> </tr> </table>			Rainfall Model	FEH	Return Period (years)	100	FEH Rainfall Version	1999	Site Location	GB 497050 103400 SU 97050 03400	C (1km)	-0.025	D1 (1km)	0.395	D2 (1km)	0.244	D3 (1km)	0.395	E (1km)	0.309	F (1km)	2.339	Summer Storms	Yes	Winter Storms	Yes	Cv (Summer)	0.750	Cv (Winter)	0.840	Shortest Storm (mins)	60	Longest Storm (mins)	10080	Climate Change %	+40	Time (mins)	Area	From: To:	(ha)	0	4 0.389
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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 1 Basin 1	
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 Basin 1.srcx

Storage is Online Cover Level (m) 5.810

Tank or Pond Structure

Invert Level (m) 4.810

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	133.0	1.000	375.0	1.001	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0148-1000-0850-1000
Design Head (m)	0.850
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	148
Invert Level (m)	4.810
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.850	10.0
Flush-Flo™	0.271	10.0
Kick-Flo®	0.598	8.5
Mean Flow over Head Range	-	8.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.3	1.200	11.8	3.000	18.2	7.000	27.3
0.200	9.8	1.400	12.7	3.500	19.6	7.500	28.2
0.300	10.0	1.600	13.5	4.000	20.9	8.000	29.1
0.400	9.8	1.800	14.3	4.500	22.1	8.500	30.0
0.500	9.4	2.000	15.0	5.000	23.2	9.000	30.7
0.600	8.5	2.200	15.7	5.500	24.3	9.500	31.6
0.800	9.7	2.400	16.3	6.000	25.4		
1.000	10.8	2.600	17.0	6.500	26.4		

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Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 2 PP2				
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 PP2.srcx</u>							
Upstream Structures		Outflow To			Overflow To		
(None)		2017-11-13 Basin 2A & 2B.srcx			(None)		
Half Drain Time : 346 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
60 min Summer	5.455	0.655	0.0	9.9	9.9	273.3	O K
120 min Summer	5.555	0.755	0.0	9.9	9.9	315.2	O K
180 min Summer	5.601	0.801	0.0	9.9	9.9	334.3	Flood Risk
240 min Summer	5.623	0.823	0.0	9.9	9.9	343.4	Flood Risk
360 min Summer	5.635	0.835	0.0	9.9	9.9	348.5	Flood Risk
480 min Summer	5.636	0.836	0.0	9.9	9.9	349.0	Flood Risk
600 min Summer	5.631	0.831	0.0	9.9	9.9	346.8	Flood Risk
720 min Summer	5.622	0.822	0.0	9.9	9.9	343.1	Flood Risk
960 min Summer	5.551	0.751	0.0	9.9	9.9	313.3	O K
1440 min Summer	5.409	0.609	0.0	9.9	9.9	254.1	O K
2160 min Summer	5.241	0.441	0.0	9.9	9.9	183.8	O K
2880 min Summer	5.120	0.320	0.0	9.9	9.9	133.6	O K
4320 min Summer	5.011	0.211	0.0	9.7	9.7	88.2	O K
5760 min Summer	4.959	0.159	0.0	9.3	9.3	66.5	O K
7200 min Summer	4.940	0.140	0.0	8.1	8.1	58.4	O K
8640 min Summer	4.926	0.126	0.0	7.3	7.3	52.7	O K
10080 min Summer	4.917	0.117	0.0	6.6	6.6	48.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
60 min Summer	60.155	0.0	295.3	62			
120 min Summer	36.520	0.0	360.1	122			
180 min Summer	27.273	0.0	404.3	182			
240 min Summer	22.171	0.0	438.7	240			
360 min Summer	16.558	0.0	492.1	310			
480 min Summer	13.460	0.0	533.8	374			
600 min Summer	11.462	0.0	568.4	440			
720 min Summer	10.052	0.0	598.3	508			
960 min Summer	7.824	0.0	620.5	646			
1440 min Summer	5.496	0.0	652.8	908			
2160 min Summer	3.861	0.0	688.3	1276			
2880 min Summer	3.005	0.0	712.5	1616			
4320 min Summer	2.244	0.0	794.9	2292			
5760 min Summer	1.824	0.0	861.0	2944			
7200 min Summer	1.554	0.0	913.7	3672			
8640 min Summer	1.362	0.0	958.5	4408			
10080 min Summer	1.219	0.0	997.1	5136			
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Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 2 PP2				
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 PP2.srcx</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	5.542	0.742	0.0	9.9	9.9	309.5	O K
120 min Winter	5.656	0.856	0.0	9.9	9.9	357.2	Flood Risk
180 min Winter	5.712	0.912	0.0	9.9	9.9	380.5	Flood Risk
240 min Winter	5.741	0.941	0.0	9.9	9.9	392.8	Flood Risk
360 min Winter	5.760	0.960	0.0	9.9	9.9	400.7	Flood Risk
480 min Winter	5.755	0.955	0.0	9.9	9.9	398.5	Flood Risk
600 min Winter	5.747	0.947	0.0	9.9	9.9	395.3	Flood Risk
720 min Winter	5.733	0.933	0.0	9.9	9.9	389.3	Flood Risk
960 min Winter	5.638	0.838	0.0	9.9	9.9	349.7	Flood Risk
1440 min Winter	5.442	0.642	0.0	9.9	9.9	268.0	O K
2160 min Winter	5.191	0.391	0.0	9.9	9.9	163.3	O K
2880 min Winter	5.038	0.238	0.0	9.8	9.8	99.3	O K
4320 min Winter	4.948	0.148	0.0	8.7	8.7	61.8	O K
5760 min Winter	4.924	0.124	0.0	7.1	7.1	51.8	O K
7200 min Winter	4.910	0.110	0.0	6.1	6.1	46.1	O K
8640 min Winter	4.901	0.101	0.0	5.4	5.4	42.2	O K
10080 min Winter	4.894	0.094	0.0	4.8	4.8	39.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
60 min Winter	60.155	0.0	331.7	62			
120 min Winter	36.520	0.0	404.4	120			
180 min Winter	27.273	0.0	453.8	176			
240 min Winter	22.171	0.0	492.4	232			
360 min Winter	16.558	0.0	552.3	340			
480 min Winter	13.460	0.0	599.0	392			
600 min Winter	11.462	0.0	637.8	466			
720 min Winter	10.052	0.0	671.4	544			
960 min Winter	7.824	0.0	696.3	700			
1440 min Winter	5.496	0.0	732.6	994			
2160 min Winter	3.861	0.0	772.6	1340			
2880 min Winter	3.005	0.0	800.0	1644			
4320 min Winter	2.244	0.0	893.0	2248			
5760 min Winter	1.824	0.0	967.3	2944			
7200 min Winter	1.554	0.0	1026.8	3680			
8640 min Winter	1.362	0.0	1077.6	4408			
10080 min Winter	1.219	0.0	1121.5	5144			
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Tuscany House	14-111 Drove Lane Yapton	
White Hart Lane	Catchment 2	
Basingstoke RG21 4AF	PP2	
Date 17/11/2017 17:12	Designed by JH	
File 2017-11-16 Cascade.casx	Checked by GG	
XP Solutions	Source Control 2017.1.2	

Cascade Rainfall Details for 2017-11-13 PP2.srcx

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 497050 103400 SU 97050 03400
C (1km)	-0.025
D1 (1km)	0.395
D2 (1km)	0.244
D3 (1km)	0.395
E (1km)	0.309
F (1km)	2.339
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.674

Time (mins)	Area
From:	To: (ha)
0	4 0.674

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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 2 PP2	
Date 17/11/2017 17:12 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 PP2.srcx

Storage is Online Cover Level (m) 5.900

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.5
Membrane Percolation (mm/hr)	1000	Length (m)	252.9
Max Percolation (l/s)	386.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.800	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0146-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	146
Invert Level (m)	4.800
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	10.0
Flush-Flo™	0.306	9.9
Kick-Flo®	0.673	8.3
Mean Flow over Head Range	-	8.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.2	1.200	10.9	3.000	16.8	7.000	25.2
0.200	9.6	1.400	11.7	3.500	18.1	7.500	26.1
0.300	9.9	1.600	12.5	4.000	19.3	8.000	26.9
0.400	9.8	1.800	13.2	4.500	20.4	8.500	27.7
0.500	9.6	2.000	13.9	5.000	21.5	9.000	28.5
0.600	9.1	2.200	14.5	5.500	22.5	9.500	29.2
0.800	9.0	2.400	15.1	6.000	23.4		
1.000	10.0	2.600	15.7	6.500	24.4		

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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 2 Basin 2A & 2B																																																																																																																																	
Date 17/11/2017 17:13 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG																																																																																																																																	
XP Solutions Source Control 2017.1.2																																																																																																																																		
<u>Cascade Summary of Results for 2017-11-13 Basin 2A & 2B.srcx</u>																																																																																																																																		
<table border="0"> <tr> <td align="center">Upstream Structures</td> <td align="center">Outflow To</td> <td align="center">Overflow To</td> </tr> <tr> <td>2017-11-13 PP2.srcx</td> <td>2017-11-13 Basin 3.srcx</td> <td>(None)</td> </tr> <tr> <td>2017-11-13 Tank 1.srcx</td> <td></td> <td></td> </tr> <tr> <td>2017-11-13 Basin 1.srcx</td> <td></td> <td></td> </tr> <tr> <td>2017-11-13 PP1a.srcx</td> <td></td> <td></td> </tr> <tr> <td>2017-11-13 PP1b.srcx</td> <td></td> <td></td> </tr> <tr> <td>2017-11-13 PP1c.srcx</td> <td></td> <td></td> </tr> </table> Half Drain Time : 277 minutes.			Upstream Structures	Outflow To	Overflow To	2017-11-13 PP2.srcx	2017-11-13 Basin 3.srcx	(None)	2017-11-13 Tank 1.srcx			2017-11-13 Basin 1.srcx			2017-11-13 PP1a.srcx			2017-11-13 PP1b.srcx			2017-11-13 PP1c.srcx																																																																																																													
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Odyssey Markides							Page 2
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Date 17/11/2017 17:13 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 Basin 2A & 2B.srcx</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	4.628	0.218	0.0	23.9	23.9	185.1	O K
10080 min Summer	4.610	0.200	0.0	21.9	21.9	169.2	O K
60 min Winter	4.902	0.492	0.0	25.0	25.0	457.8	O K
120 min Winter	4.987	0.577	0.0	25.0	25.0	552.0	O K
180 min Winter	5.043	0.633	0.0	25.0	25.0	616.3	Flood Risk
240 min Winter	5.082	0.672	0.0	25.0	25.0	662.9	Flood Risk
360 min Winter	5.136	0.726	0.0	25.0	25.0	728.2	Flood Risk
480 min Winter	5.171	0.761	0.0	25.0	25.0	772.0	Flood Risk
600 min Winter	5.194	0.784	0.0	25.0	25.0	801.3	Flood Risk
720 min Winter	5.208	0.798	0.0	25.0	25.0	820.0	Flood Risk
960 min Winter	5.188	0.778	0.0	25.0	25.0	793.6	Flood Risk
1440 min Winter	5.159	0.749	0.0	25.0	25.0	757.6	Flood Risk
2160 min Winter	5.118	0.708	0.0	25.0	25.0	707.2	Flood Risk
2880 min Winter	4.990	0.580	0.0	25.0	25.0	555.9	O K
4320 min Winter	4.749	0.339	0.0	25.0	25.0	299.8	O K
5760 min Winter	4.628	0.218	0.0	24.0	24.0	185.8	O K
7200 min Winter	4.601	0.191	0.0	20.7	20.7	161.1	O K
8640 min Winter	4.583	0.173	0.0	18.2	18.2	145.2	O K
10080 min Winter	4.571	0.161	0.0	16.4	16.4	134.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
8640 min Summer	1.362	0.0	3325.5	4456			
10080 min Summer	1.219	0.0	3461.9	5152			
60 min Winter	60.155	0.0	1140.8	62			
120 min Winter	36.520	0.0	1388.7	122			
180 min Winter	27.273	0.0	1557.5	182			
240 min Winter	22.171	0.0	1689.2	240			
360 min Winter	16.558	0.0	1893.6	358			
480 min Winter	13.460	0.0	2053.1	474			
600 min Winter	11.462	0.0	2185.7	590			
720 min Winter	10.052	0.0	2300.1	702			
960 min Winter	7.824	0.0	2385.5	916			
1440 min Winter	5.496	0.0	2509.2	1372			
2160 min Winter	3.861	0.0	2658.3	1668			
2880 min Winter	3.005	0.0	2755.2	1936			
4320 min Winter	2.244	0.0	3077.3	2524			
5760 min Winter	1.824	0.0	3342.2	3056			
7200 min Winter	1.554	0.0	3552.4	3744			
8640 min Winter	1.362	0.0	3732.2	4440			
10080 min Winter	1.219	0.0	3887.4	5184			
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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 2 Basin 2A & 2B	
Date 17/11/2017 17:13 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 Basin 2A & 2B.srcx

Storage is Online Cover Level (m) 5.310

Complex Structure

Tank or Pond

Invert Level (m) 4.410

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	86.0	1.000	276.0

Tank or Pond

Invert Level (m) 4.410

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	705.0	1.000	1158.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0221-2500-0800-2500
Design Head (m)	0.800
Design Flow (l/s)	25.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	221
Invert Level (m)	4.410
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	25.0
Flush-Flo™	0.341	25.0
Kick-Flo®	0.620	22.2
Mean Flow over Head Range	-	20.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.4	0.300	24.9	0.500	24.2	0.800	25.0
0.200	21.8	0.400	24.9	0.600	22.7	1.000	27.8

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4.000	54.2																																																						
4.500	57.4																																																						
Depth (m)	Flow (l/s)																																																						
5.000	60.4																																																						
5.500	63.3																																																						
6.000	66.0																																																						
6.500	68.7																																																						
7.000	71.2																																																						
7.500	73.6																																																						
Depth (m)	Flow (l/s)																																																						
8.000	76.0																																																						
8.500	77.8																																																						
9.000	80.1																																																						
9.500	82.3																																																						
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Odyssey Markides		Page 1			
Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 3 Basin 3				
Date 17/11/2017 17:13 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG				
XP Solutions					
Source Control 2017.1.2					
<u>Cascade Summary of Results for 2017-11-13 Basin 3.srcx</u>					
Upstream Structures	Outflow To	Overflow To			
2017-11-13 Basin 2A & 2B.srcx 2017-11-13 PP2.srcx 2017-11-13 Tank 1.srcx 2017-11-13 Basin 1.srcx 2017-11-13 PPl.a.srcx 2017-11-13 PPl.b.srcx 2017-11-13 PPl.c.srcx	2017-11-13 Basin 4.srcx	(None)			
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Summer	4.840	0.810	66.9	187.1	Flood Risk
120 min Summer	4.824	0.794	66.9	182.2	Flood Risk
180 min Summer	4.793	0.763	66.9	172.2	Flood Risk
240 min Summer	4.748	0.718	66.9	158.6	Flood Risk
360 min Summer	4.647	0.617	66.9	129.8	O K
480 min Summer	4.553	0.523	66.9	105.0	O K
600 min Summer	4.476	0.446	66.8	86.1	O K
720 min Summer	4.418	0.388	66.2	72.6	O K
960 min Summer	4.340	0.310	63.5	55.8	O K
1440 min Summer	4.297	0.267	53.1	47.0	O K
2160 min Summer	4.268	0.238	44.9	41.3	O K
2880 min Summer	4.253	0.223	40.6	38.3	O K
4320 min Summer	4.239	0.209	36.6	35.6	O K
5760 min Summer	4.231	0.201	34.2	34.1	O K
7200 min Summer	4.224	0.194	32.4	32.9	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Summer	60.155	0.0	1302.7	48	
120 min Summer	36.520	0.0	1585.5	82	
180 min Summer	27.273	0.0	1778.0	118	
240 min Summer	22.171	0.0	1928.4	150	
360 min Summer	16.558	0.0	2161.7	212	
480 min Summer	13.460	0.0	2343.8	270	
600 min Summer	11.462	0.0	2495.2	326	
720 min Summer	10.052	0.0	2625.9	384	
960 min Summer	7.824	0.0	2723.7	492	
1440 min Summer	5.496	0.0	2865.9	734	
2160 min Summer	3.861	0.0	3033.7	1100	
2880 min Summer	3.005	0.0	3144.5	1460	
4320 min Summer	2.244	0.0	3512.2	2172	
5760 min Summer	1.824	0.0	3815.6	2936	
7200 min Summer	1.554	0.0	4056.2	3672	
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Odyssey Markides					Page 2
Tuscany House White Hart Lane Basingstoke RG21 4AF		14-111 Drove Lane Yapton Catchment 3 Basin 3			
Date 17/11/2017 17:13 File 2017-11-16 Cascade.casx		Designed by JH Checked by GG			
XP Solutions		Source Control 2017.1.2			
<u>Cascade Summary of Results for 2017-11-13 Basin 3.srcx</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
8640 min Summer	4.218	0.188	30.8	31.7	O K
10080 min Summer	4.208	0.178	28.0	29.9	O K
60 min Winter	4.916	0.886	66.9	212.2	Flood Risk
120 min Winter	4.885	0.855	66.9	201.7	Flood Risk
180 min Winter	4.828	0.798	66.9	183.5	Flood Risk
240 min Winter	4.752	0.722	66.9	159.8	Flood Risk
360 min Winter	4.582	0.552	66.9	112.4	O K
480 min Winter	4.447	0.417	66.6	79.3	O K
600 min Winter	4.362	0.332	64.9	60.5	O K
720 min Winter	4.332	0.302	61.6	54.0	O K
960 min Winter	4.299	0.269	53.6	47.4	O K
1440 min Winter	4.269	0.239	45.2	41.5	O K
2160 min Winter	4.249	0.219	39.4	37.5	O K
2880 min Winter	4.238	0.208	36.4	35.4	O K
4320 min Winter	4.227	0.197	33.3	33.4	O K
5760 min Winter	4.218	0.188	30.6	31.7	O K
7200 min Winter	4.202	0.172	26.4	28.8	O K
8640 min Winter	4.190	0.160	23.3	26.6	O K
10080 min Winter	4.181	0.151	20.9	24.9	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
8640 min Summer	1.362	0.0	4261.8	4408	
10080 min Summer	1.219	0.0	4438.8	5136	
60 min Winter	60.155	0.0	1461.3	52	
120 min Winter	36.520	0.0	1778.1	88	
180 min Winter	27.273	0.0	1993.7	126	
240 min Winter	22.171	0.0	2162.1	162	
360 min Winter	16.558	0.0	2423.4	220	
480 min Winter	13.460	0.0	2627.3	274	
600 min Winter	11.462	0.0	2796.9	320	
720 min Winter	10.052	0.0	2943.3	370	
960 min Winter	7.824	0.0	3052.8	490	
1440 min Winter	5.496	0.0	3212.0	726	
2160 min Winter	3.861	0.0	3401.1	1080	
2880 min Winter	3.005	0.0	3526.0	1452	
4320 min Winter	2.244	0.0	3940.1	2224	
5760 min Winter	1.824	0.0	4278.8	3000	
7200 min Winter	1.554	0.0	4549.3	3704	
8640 min Winter	1.362	0.0	4781.1	4416	
10080 min Winter	1.219	0.0	4981.9	5144	
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Tuscany House	14-111 Drove Lane Yapton	
White Hart Lane	Catchment 3	
Basingstoke RG21 4AF	Basin 3	
Date 17/11/2017 17:13	Designed by JH	
File 2017-11-16 Cascade.casx	Checked by GG	
XP Solutions	Source Control 2017.1.2	

Cascade Rainfall Details for 2017-11-13 Basin 3.srcx

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 497050 103400 SU 97050 03400
C (1km)	-0.025
D1 (1km)	0.395
D2 (1km)	0.244
D3 (1km)	0.395
E (1km)	0.309
F (1km)	2.339
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.637

Time (mins)	Area
From:	To: (ha)
0	4 0.637

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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 3 Basin 3	
Date 17/11/2017 17:13 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 Basin 3.srcx

Storage is Online Cover Level (m) 5.030

Tank or Pond Structure

Invert Level (m) 4.030

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	152.0	1.000	369.0	1.001	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0334-6700-0900-6700
Design Head (m)	0.900
Design Flow (l/s)	67.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	334
Invert Level (m)	4.030
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	66.9
Flush-Flo™	0.477	66.9
Kick-Flo®	0.752	61.4
Mean Flow over Head Range	-	51.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	9.8	1.200	76.9	3.000	120.1	7.000	181.8
0.200	34.0	1.400	82.9	3.500	129.5	7.500	188.0
0.300	61.2	1.600	88.4	4.000	138.2	8.000	194.1
0.400	66.4	1.800	93.6	4.500	146.4	8.500	199.9
0.500	66.9	2.000	98.6	5.000	154.1	9.000	205.6
0.600	65.9	2.200	103.2	5.500	161.5	9.500	209.4
0.800	63.2	2.400	107.7	6.000	168.5		
1.000	70.4	2.600	112.0	6.500	175.3		

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Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 4 Tank 4a				
Date 17/11/2017 17:14 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 Tank 4a.srcx</u>							
Upstream Structures			Outflow To		Overflow To		
(None)			2017-11-13 Basin 4.srcx		(None)		
Half Drain Time : 1366 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Summer	4.930	0.420	0.0	6.5	6.5	538.7	O K
120 min Summer	5.011	0.501	0.0	6.5	6.5	642.5	O K
180 min Summer	5.063	0.553	0.0	6.5	6.5	708.6	O K
240 min Summer	5.100	0.590	0.0	6.5	6.5	756.5	O K
360 min Summer	5.151	0.641	0.0	6.5	6.5	821.9	O K
480 min Summer	5.184	0.674	0.0	6.5	6.5	864.5	O K
600 min Summer	5.207	0.697	0.0	6.5	6.5	893.6	O K
720 min Summer	5.222	0.712	0.0	6.5	6.5	913.8	O K
960 min Summer	5.204	0.694	0.0	6.5	6.5	890.5	O K
1440 min Summer	5.163	0.653	0.0	6.5	6.5	837.5	O K
2160 min Summer	5.111	0.601	0.0	6.5	6.5	770.3	O K
2880 min Summer	5.062	0.552	0.0	6.5	6.5	707.6	O K
4320 min Summer	5.016	0.506	0.0	6.5	6.5	648.7	O K
5760 min Summer	4.968	0.458	0.0	6.5	6.5	587.1	O K
7200 min Summer	4.922	0.412	0.0	6.5	6.5	527.8	O K
8640 min Summer	4.878	0.368	0.0	6.5	6.5	472.0	O K
10080 min Summer	4.838	0.328	0.0	6.5	6.5	420.7	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
60 min Summer	60.155	0.0	532.6	68			
120 min Summer	36.520	0.0	646.7	126			
180 min Summer	27.273	0.0	722.7	186			
240 min Summer	22.171	0.0	780.4	246			
360 min Summer	16.558	0.0	865.7	364			
480 min Summer	13.460	0.0	925.1	484			
600 min Summer	11.462	0.0	964.0	602			
720 min Summer	10.052	0.0	982.2	722			
960 min Summer	7.824	0.0	966.4	960			
1440 min Summer	5.496	0.0	913.1	1210			
2160 min Summer	3.861	0.0	1263.4	1580			
2880 min Summer	3.005	0.0	1308.4	1988			
4320 min Summer	2.244	0.0	1452.0	2772			
5760 min Summer	1.824	0.0	1609.8	3576			
7200 min Summer	1.554	0.0	1712.4	4328			
8640 min Summer	1.362	0.0	1799.1	5096			
10080 min Summer	1.219	0.0	1871.2	5848			
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Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 4 Tank 4a				
Date 17/11/2017 17:14 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 Tank 4a.srcx</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	4.982	0.472	0.0	6.5	6.5	605.2	O K
120 min Winter	5.074	0.564	0.0	6.5	6.5	723.4	O K
180 min Winter	5.132	0.622	0.0	6.5	6.5	798.1	O K
240 min Winter	5.175	0.665	0.0	6.5	6.5	852.3	O K
360 min Winter	5.233	0.723	0.0	6.5	6.5	927.7	O K
480 min Winter	5.273	0.763	0.0	6.5	6.5	978.1	O K
600 min Winter	5.300	0.790	0.0	6.5	6.5	1013.7	O K
720 min Winter	5.322	0.812	0.0	6.5	6.5	1039.3	O K
960 min Winter	5.305	0.795	0.0	6.5	6.5	1019.1	O K
1440 min Winter	5.259	0.749	0.0	6.5	6.5	960.5	O K
2160 min Winter	5.193	0.683	0.0	6.5	6.5	875.9	O K
2880 min Winter	5.132	0.622	0.0	6.5	6.5	797.1	O K
4320 min Winter	5.065	0.555	0.0	6.5	6.5	711.2	O K
5760 min Winter	4.979	0.469	0.0	6.5	6.5	602.1	O K
7200 min Winter	4.903	0.393	0.0	6.5	6.5	504.4	O K
8640 min Winter	4.835	0.325	0.0	6.5	6.5	417.2	O K
10080 min Winter	4.777	0.267	0.0	6.5	6.5	342.5	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
60 min Winter	60.155	0.0	597.0	66			
120 min Winter	36.520	0.0	722.9	124			
180 min Winter	27.273	0.0	805.7	184			
240 min Winter	22.171	0.0	867.5	242			
360 min Winter	16.558	0.0	953.3	358			
480 min Winter	13.460	0.0	1000.1	474			
600 min Winter	11.462	0.0	1010.5	590			
720 min Winter	10.052	0.0	1003.6	704			
960 min Winter	7.824	0.0	980.7	926			
1440 min Winter	5.496	0.0	932.3	1344			
2160 min Winter	3.861	0.0	1414.0	1668			
2880 min Winter	3.005	0.0	1462.9	2136			
4320 min Winter	2.244	0.0	1610.9	3072			
5760 min Winter	1.824	0.0	1803.5	3864			
7200 min Winter	1.554	0.0	1918.9	4616			
8640 min Winter	1.362	0.0	2016.8	5360			
10080 min Winter	1.219	0.0	2099.1	6048			
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Tuscany House	14-111 Drove Lane Yapton	
White Hart Lane	Catchment 4	
Basingstoke RG21 4AF	Tank 4a	
Date 17/11/2017 17:14	Designed by JH	
File 2017-11-16 Cascade.casx	Checked by GG	
XP Solutions	Source Control 2017.1.2	

Cascade Rainfall Details for 2017-11-13 Tank 4a.srcx

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 497050 103400 SU 97050 03400
C (1km)	-0.025
D1 (1km)	0.395
D2 (1km)	0.244
D3 (1km)	0.395
E (1km)	0.309
F (1km)	2.339
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.231

Time (mins)	Area	Time (mins)	Area
From:	To: (ha)	From:	To: (ha)
0	4 0.615	4	8 0.616

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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 4 Tank 4a	
Date 17/11/2017 17:14 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 Tank 4a.srcx

Storage is Online Cover Level (m) 6.110

Cellular Storage Structure

Invert Level (m) 4.510 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	1350.0	1350.0	0.900	0.0	1470.0
0.800	1350.0	1470.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0122-6500-0800-6500
Design Head (m) 0.800
Design Flow (l/s) 6.5
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 122
Invert Level (m) 4.510
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	6.5
Flush-Flo™	0.246	6.5
Kick-Flo®	0.547	5.4
Mean Flow over Head Range	-	5.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.4	1.200	7.9	3.000	12.1	7.000	18.1
0.200	6.4	1.400	8.4	3.500	13.0	7.500	18.8
0.300	6.4	1.600	9.0	4.000	13.9	8.000	19.3
0.400	6.3	1.800	9.5	4.500	14.7	8.500	19.9
0.500	5.9	2.000	10.0	5.000	15.4	9.000	20.5
0.600	5.7	2.200	10.4	5.500	16.2	9.500	21.0
0.800	6.5	2.400	10.9	6.000	16.8		
1.000	7.2	2.600	11.3	6.500	17.5		

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Tuscany House White Hart Lane Basingstoke RG21 4AF		14-111 Drove Lane Yapton Catchment 4 Basin 4			
Date 23/11/2017 12:42 File 2017-11-16 Cascade.casx		Designed by JH Checked by GG			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for 2017-11-13 Basin 4.srcx</u>					
Upstream Structures		Outflow To Overflow To			
2017-11-13 Basin 3.srcx		(None)		(None)	
2017-11-13 Basin 2A & 2B.srcx					
2017-11-13 PP2.srcx					
2017-11-13 Tank 1.srcx					
2017-11-13 Basin 1.srcx					
2017-11-13 PP1a.srcx					
2017-11-13 PP1b.srcx					
2017-11-13 PP1c.srcx					
2017-11-13 Basin 5.srcx					
2017-11-13 Basin 6.srcx					
2017-11-13 PP6.srcx					
2017-11-13 Tank 4a.srcx					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Summer	3.442	0.492	45.4	378.1	O K
120 min Summer	3.531	0.581	45.4	462.8	O K
180 min Summer	3.589	0.639	45.4	522.5	O K
240 min Summer	3.633	0.683	45.4	568.5	O K
360 min Summer	3.677	0.727	45.4	615.7	O K
480 min Summer	3.709	0.759	45.4	650.8	O K
600 min Summer	3.733	0.783	45.4	678.8	O K
720 min Summer	3.746	0.796	45.4	693.8	O K
960 min Summer	3.700	0.750	45.4	641.2	O K
1440 min Summer	3.629	0.679	45.4	563.9	O K
2160 min Summer	3.550	0.600	45.4	482.4	O K
2880 min Summer	3.488	0.538	45.4	420.9	O K
4320 min Summer	3.417	0.467	45.4	354.5	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Summer	60.155	0.0	2447.1	130	
120 min Summer	36.520	0.0	2967.0	172	
180 min Summer	27.273	0.0	3309.8	208	
240 min Summer	22.171	0.0	3566.4	246	
360 min Summer	16.558	0.0	3953.5	362	
480 min Summer	13.460	0.0	4245.5	482	
600 min Summer	11.462	0.0	4471.8	602	
720 min Summer	10.052	0.0	4640.5	722	
960 min Summer	7.824	0.0	4718.7	788	
1440 min Summer	5.496	0.0	4789.9	958	
2160 min Summer	3.861	0.0	5744.3	1332	
2880 min Summer	3.005	0.0	5946.4	1716	
4320 min Summer	2.244	0.0	6554.9	2476	
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Odyssey Markides LLP				Page 2																																																																																																																																					
Tuscany House White Hart Lane Basingstoke RG21 4AF		14-111 Drove Lane Yapton Catchment 4 Basin 4																																																																																																																																							
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Date 23/11/2017 12:42 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
Micro Drainage Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 Basin 4.srcx

Storage is Online Cover Level (m) 4.250

Tank or Pond Structure

Invert Level (m) 2.950

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	618.0	1.300	1575.0	1.301	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0282-4540-1000-4540
Design Head (m)	1.000
Design Flow (l/s)	45.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	282
Invert Level (m)	2.950
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	45.4
Flush-Flo™	0.433	45.4
Kick-Flo®	0.777	40.2
Mean Flow over Head Range	-	36.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.8	1.200	49.6	3.000	77.2	7.000	116.7
0.200	29.1	1.400	53.4	3.500	83.2	7.500	120.7
0.300	44.2	1.600	56.9	4.000	88.8	8.000	124.6
0.400	45.3	1.800	60.3	4.500	94.1	8.500	128.3
0.500	45.2	2.000	63.4	5.000	99.0	9.000	131.9
0.600	44.3	2.200	66.4	5.500	103.7	9.500	135.5
0.800	40.8	2.400	69.3	6.000	108.2		
1.000	45.4	2.600	72.0	6.500	112.5		

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<u>Cascade Summary of Results for 2017-11-13 Basin 5.srcx</u>						
Upstream Structures		Outflow To		Overflow To		
2017-11-13 Basin 6.srcx 2017-11-13 PP6.srcx		2017-11-13 Basin 4.srcx		(None)		
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	
60 min Summer	4.338	0.498	5.0	235.5	O K	
120 min Summer	4.420	0.580	5.0	280.4	O K	
180 min Summer	4.469	0.629	5.0	308.6	O K	
240 min Summer	4.504	0.664	5.0	328.6	O K	
360 min Summer	4.550	0.710	5.0	355.7	Flood Risk	
480 min Summer	4.579	0.739	5.0	373.0	Flood Risk	
600 min Summer	4.598	0.758	5.0	384.6	Flood Risk	
720 min Summer	4.610	0.770	5.0	392.3	Flood Risk	
960 min Summer	4.591	0.751	5.0	380.4	Flood Risk	
1440 min Summer	4.548	0.708	5.0	354.6	Flood Risk	
2160 min Summer	4.493	0.653	5.0	322.4	O K	
2880 min Summer	4.443	0.603	5.0	293.3	O K	
4320 min Summer	4.386	0.546	5.0	261.7	O K	
5760 min Summer	4.325	0.485	5.0	228.3	O K	
7200 min Summer	4.268	0.428	5.0	198.5	O K	
8640 min Summer	4.216	0.376	5.0	172.0	O K	
10080 min Summer	4.170	0.330	5.0	149.2	O K	
60 min Winter	4.391	0.551	5.0	264.5	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)		
60 min Summer	60.155	0.0	457.0	64		
120 min Summer	36.520	0.0	550.1	124		
180 min Summer	27.273	0.0	607.1	182		
240 min Summer	22.171	0.0	641.4	242		
360 min Summer	16.558	0.0	684.0	362		
480 min Summer	13.460	0.0	716.8	482		
600 min Summer	11.462	0.0	742.8	602		
720 min Summer	10.052	0.0	759.0	720		
960 min Summer	7.824	0.0	750.5	960		
1440 min Summer	5.496	0.0	715.5	1210		
2160 min Summer	3.861	0.0	1069.1	1580		
2880 min Summer	3.005	0.0	1104.9	1992		
4320 min Summer	2.244	0.0	1170.1	2808		
5760 min Summer	1.824	0.0	1354.0	3568		
7200 min Summer	1.554	0.0	1439.7	4320		
8640 min Summer	1.362	0.0	1513.1	5016		
10080 min Summer	1.219	0.0	1575.9	5656		
60 min Winter	60.155	0.0	510.1	62		
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Tuscany House White Hart Lane Basingstoke RG21 4AF		14-111 Drove Lane Yapton Catchment 5 Basin 5			
Date 23/11/2017 12:42 File 2017-11-16 Cascade.casx		Designed by JH Checked by GG			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for 2017-11-13 Basin 5.srcx</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
120 min Winter	4.482	0.642	5.0	315.7	O K
180 min Winter	4.536	0.696	5.0	347.6	O K
240 min Winter	4.575	0.735	5.0	370.5	Flood Risk
360 min Winter	4.626	0.786	5.0	402.2	Flood Risk
480 min Winter	4.660	0.820	5.0	423.1	Flood Risk
600 min Winter	4.683	0.843	5.0	437.7	Flood Risk
720 min Winter	4.699	0.859	5.0	448.0	Flood Risk
960 min Winter	4.682	0.842	5.0	437.5	Flood Risk
1440 min Winter	4.638	0.798	5.0	409.3	Flood Risk
2160 min Winter	4.572	0.732	5.0	368.9	Flood Risk
2880 min Winter	4.510	0.670	5.0	332.1	O K
4320 min Winter	4.438	0.598	5.0	290.5	O K
5760 min Winter	4.326	0.486	5.0	229.2	O K
7200 min Winter	4.231	0.391	5.0	179.4	O K
8640 min Winter	4.150	0.310	5.0	139.0	O K
10080 min Winter	4.090	0.250	5.0	110.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
120 min Winter	36.520	0.0	607.8	122	
180 min Winter	27.273	0.0	655.7	180	
240 min Winter	22.171	0.0	687.0	240	
360 min Winter	16.558	0.0	735.5	356	
480 min Winter	13.460	0.0	769.1	472	
600 min Winter	11.462	0.0	776.9	588	
720 min Winter	10.052	0.0	771.8	702	
960 min Winter	7.824	0.0	756.6	924	
1440 min Winter	5.496	0.0	725.3	1344	
2160 min Winter	3.861	0.0	1193.5	1684	
2880 min Winter	3.005	0.0	1226.4	2160	
4320 min Winter	2.244	0.0	1274.3	3116	
5760 min Winter	1.824	0.0	1517.7	3864	
7200 min Winter	1.554	0.0	1614.0	4544	
8640 min Winter	1.362	0.0	1696.4	5192	
10080 min Winter	1.219	0.0	1767.9	5744	
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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 5 Basin 5	
Date 23/11/2017 12:42 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
Micro Drainage Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 Basin 5.srcx

Storage is Online Cover Level (m) 4.840

Tank or Pond Structure

Invert Level (m) 3.840

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	411.0	1.000	683.0	1.001	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0107-5000-0870-5000
Design Head (m)	0.870
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	107
Invert Level (m)	3.840
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.870	5.0
Flush-Flo™	0.261	5.0
Kick-Flo®	0.573	4.1
Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.7	1.200	5.8	3.000	8.9	7.000	13.3
0.200	4.9	1.400	6.2	3.500	9.6	7.500	13.8
0.300	5.0	1.600	6.6	4.000	10.2	8.000	14.2
0.400	4.9	1.800	7.0	4.500	10.8	8.500	14.6
0.500	4.6	2.000	7.4	5.000	11.4	9.000	15.0
0.600	4.2	2.200	7.7	5.500	11.9	9.500	15.4
0.800	4.8	2.400	8.0	6.000	12.4		
1.000	5.3	2.600	8.3	6.500	12.9		

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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 6 PP6																																																																																																																																																																																																																																																				
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<u>Cascade Summary of Results for 2017-11-13 PP6.srcx</u> <table><tr><td>Upstream Structures</td><td>Outflow To</td><td>Overflow To</td></tr><tr><td>(None)</td><td>2017-11-13 Basin 6.srcx</td><td>(None)</td></tr><tr><td colspan="3">Half Drain Time : 749 minutes.</td></tr></table> <table><tr><td>Storm Event</td><td>Max Level (m)</td><td>Max Depth (m)</td><td>Max Infiltration (l/s)</td><td>Max Control (l/s)</td><td>Max E Outflow (l/s)</td><td>Max Volume (m³)</td><td>Status</td></tr><tr><td>60 min Summer</td><td>5.435</td><td>0.435</td><td>0.0</td><td>1.5</td><td>1.5</td><td>75.0</td><td>O K</td></tr><tr><td>120 min Summer</td><td>5.516</td><td>0.516</td><td>0.0</td><td>1.5</td><td>1.5</td><td>88.9</td><td>O K</td></tr><tr><td>180 min Summer</td><td>5.562</td><td>0.562</td><td>0.0</td><td>1.5</td><td>1.5</td><td>97.0</td><td>O K</td></tr><tr><td>240 min Summer</td><td>5.593</td><td>0.593</td><td>0.0</td><td>1.5</td><td>1.5</td><td>102.3</td><td>O K</td></tr><tr><td>360 min Summer</td><td>5.630</td><td>0.630</td><td>0.0</td><td>1.5</td><td>1.5</td><td>108.6</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>5.647</td><td>0.647</td><td>0.0</td><td>1.5</td><td>1.5</td><td>111.6</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>5.654</td><td>0.654</td><td>0.0</td><td>1.5</td><td>1.5</td><td>112.8</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>5.656</td><td>0.656</td><td>0.0</td><td>1.5</td><td>1.5</td><td>113.1</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>5.622</td><td>0.622</td><td>0.0</td><td>1.5</td><td>1.5</td><td>107.2</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>5.562</td><td>0.562</td><td>0.0</td><td>1.5</td><td>1.5</td><td>96.9</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>5.480</td><td>0.480</td><td>0.0</td><td>1.5</td><td>1.5</td><td>82.8</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>5.401</td><td>0.401</td><td>0.0</td><td>1.5</td><td>1.5</td><td>69.1</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>5.322</td><td>0.322</td><td>0.0</td><td>1.5</td><td>1.5</td><td>55.5</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>5.255</td><td>0.255</td><td>0.0</td><td>1.5</td><td>1.5</td><td>44.0</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>5.203</td><td>0.203</td><td>0.0</td><td>1.5</td><td>1.5</td><td>35.0</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>5.164</td><td>0.164</td><td>0.0</td><td>1.5</td><td>1.5</td><td>28.2</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>5.135</td><td>0.135</td><td>0.0</td><td>1.4</td><td>1.4</td><td>23.3</td><td>O K</td></tr></table> <table><tr><td>Storm Event</td><td>Rain (mm/hr)</td><td>Flooded Volume (m³)</td><td>Discharge Volume (m³)</td><td>Time-Peak (mins)</td></tr><tr><td>60 min Summer</td><td>60.155</td><td>0.0</td><td>78.2</td><td>64</td></tr><tr><td>120 min Summer</td><td>36.520</td><td>0.0</td><td>95.5</td><td>122</td></tr><tr><td>180 min Summer</td><td>27.273</td><td>0.0</td><td>107.3</td><td>182</td></tr><tr><td>240 min Summer</td><td>22.171</td><td>0.0</td><td>116.5</td><td>242</td></tr><tr><td>360 min Summer</td><td>16.558</td><td>0.0</td><td>130.7</td><td>362</td></tr><tr><td>480 min Summer</td><td>13.460</td><td>0.0</td><td>141.8</td><td>480</td></tr><tr><td>600 min Summer</td><td>11.462</td><td>0.0</td><td>151.0</td><td>586</td></tr><tr><td>720 min Summer</td><td>10.052</td><td>0.0</td><td>158.8</td><td>642</td></tr><tr><td>960 min Summer</td><td>7.824</td><td>0.0</td><td>164.6</td><td>760</td></tr><tr><td>1440 min Summer</td><td>5.496</td><td>0.0</td><td>172.5</td><td>1012</td></tr><tr><td>2160 min Summer</td><td>3.861</td><td>0.0</td><td>182.9</td><td>1428</td></tr><tr><td>2880 min Summer</td><td>3.005</td><td>0.0</td><td>189.1</td><td>1792</td></tr><tr><td>4320 min Summer</td><td>2.244</td><td>0.0</td><td>210.6</td><td>2552</td></tr><tr><td>5760 min Summer</td><td>1.824</td><td>0.0</td><td>227.8</td><td>3288</td></tr><tr><td>7200 min Summer</td><td>1.554</td><td>0.0</td><td>241.3</td><td>3968</td></tr><tr><td>8640 min Summer</td><td>1.362</td><td>0.0</td><td>252.8</td><td>4664</td></tr><tr><td>10080 min Summer</td><td>1.219</td><td>0.0</td><td>262.5</td><td>5344</td></tr></table>			Upstream Structures	Outflow To	Overflow To	(None)	2017-11-13 Basin 6.srcx	(None)	Half Drain Time : 749 minutes.			Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status	60 min Summer	5.435	0.435	0.0	1.5	1.5	75.0	O K	120 min Summer	5.516	0.516	0.0	1.5	1.5	88.9	O K	180 min Summer	5.562	0.562	0.0	1.5	1.5	97.0	O K	240 min Summer	5.593	0.593	0.0	1.5	1.5	102.3	O K	360 min Summer	5.630	0.630	0.0	1.5	1.5	108.6	Flood Risk	480 min Summer	5.647	0.647	0.0	1.5	1.5	111.6	Flood Risk	600 min Summer	5.654	0.654	0.0	1.5	1.5	112.8	Flood Risk	720 min Summer	5.656	0.656	0.0	1.5	1.5	113.1	Flood Risk	960 min Summer	5.622	0.622	0.0	1.5	1.5	107.2	Flood Risk	1440 min Summer	5.562	0.562	0.0	1.5	1.5	96.9	O K	2160 min Summer	5.480	0.480	0.0	1.5	1.5	82.8	O K	2880 min Summer	5.401	0.401	0.0	1.5	1.5	69.1	O K	4320 min Summer	5.322	0.322	0.0	1.5	1.5	55.5	O K	5760 min Summer	5.255	0.255	0.0	1.5	1.5	44.0	O K	7200 min Summer	5.203	0.203	0.0	1.5	1.5	35.0	O K	8640 min Summer	5.164	0.164	0.0	1.5	1.5	28.2	O K	10080 min Summer	5.135	0.135	0.0	1.4	1.4	23.3	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	60 min Summer	60.155	0.0	78.2	64	120 min Summer	36.520	0.0	95.5	122	180 min Summer	27.273	0.0	107.3	182	240 min Summer	22.171	0.0	116.5	242	360 min Summer	16.558	0.0	130.7	362	480 min Summer	13.460	0.0	141.8	480	600 min Summer	11.462	0.0	151.0	586	720 min Summer	10.052	0.0	158.8	642	960 min Summer	7.824	0.0	164.6	760	1440 min Summer	5.496	0.0	172.5	1012	2160 min Summer	3.861	0.0	182.9	1428	2880 min Summer	3.005	0.0	189.1	1792	4320 min Summer	2.244	0.0	210.6	2552	5760 min Summer	1.824	0.0	227.8	3288	7200 min Summer	1.554	0.0	241.3	3968	8640 min Summer	1.362	0.0	252.8	4664	10080 min Summer	1.219	0.0	262.5	5344
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Tuscany House White Hart Lane Basingstoke RG21 4AF			14-111 Drove Lane Yapton Catchment 6 PP6				
Date 17/11/2017 17:14 File 2017-11-16 Cascade.casx			Designed by JH Checked by GG				
XP Solutions			Source Control 2017.1.2				
<u>Cascade Summary of Results for 2017-11-13 PP6.srcx</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	5.492	0.492	0.0	1.5	1.5	84.8	O K
120 min Winter	5.583	0.583	0.0	1.5	1.5	100.6	O K
180 min Winter	5.637	0.637	0.0	1.5	1.5	109.9	Flood Risk
240 min Winter	5.673	0.673	0.0	1.5	1.5	116.2	Flood Risk
360 min Winter	5.718	0.718	0.0	1.5	1.5	123.9	Flood Risk
480 min Winter	5.742	0.742	0.0	1.5	1.5	128.1	Flood Risk
600 min Winter	5.754	0.754	0.0	1.5	1.5	130.2	Flood Risk
720 min Winter	5.759	0.759	0.0	1.5	1.5	130.9	Flood Risk
960 min Winter	5.714	0.714	0.0	1.5	1.5	123.2	Flood Risk
1440 min Winter	5.640	0.640	0.0	1.5	1.5	110.5	Flood Risk
2160 min Winter	5.534	0.534	0.0	1.5	1.5	92.1	O K
2880 min Winter	5.417	0.417	0.0	1.5	1.5	72.0	O K
4320 min Winter	5.290	0.290	0.0	1.5	1.5	49.9	O K
5760 min Winter	5.196	0.196	0.0	1.5	1.5	33.8	O K
7200 min Winter	5.137	0.137	0.0	1.4	1.4	23.6	O K
8640 min Winter	5.101	0.101	0.0	1.3	1.3	17.4	O K
10080 min Winter	5.082	0.082	0.0	1.3	1.3	14.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
60 min Winter	60.155	0.0	87.9	62			
120 min Winter	36.520	0.0	107.4	120			
180 min Winter	27.273	0.0	120.6	180			
240 min Winter	22.171	0.0	130.9	238			
360 min Winter	16.558	0.0	146.8	352			
480 min Winter	13.460	0.0	159.2	466			
600 min Winter	11.462	0.0	169.4	576			
720 min Winter	10.052	0.0	178.2	684			
960 min Winter	7.824	0.0	184.5	798			
1440 min Winter	5.496	0.0	193.1	1084			
2160 min Winter	3.861	0.0	205.5	1556			
2880 min Winter	3.005	0.0	212.6	1956			
4320 min Winter	2.244	0.0	237.0	2684			
5760 min Winter	1.824	0.0	256.3	3400			
7200 min Winter	1.554	0.0	271.7	4032			
8640 min Winter	1.362	0.0	284.8	4664			
10080 min Winter	1.219	0.0	296.0	5240			
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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 6 PP6	
Date 17/11/2017 17:14 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
XP Solutions Source Control 2017.1.2		

Cascade Rainfall Details for 2017-11-13 PP6.srcx

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 497050 103400 SU 97050 03400
C (1km)	-0.025
D1 (1km)	0.395
D2 (1km)	0.244
D3 (1km)	0.395
E (1km)	0.309
F (1km)	2.339
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.181

Time (mins)	Area
From:	To: (ha)
0	4 0.181

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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 6 PP6	
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Cascade Model Details for 2017-11-13 PP6.srcx

Storage is Online Cover Level (m) 5.900

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	119.8
Max Percolation (l/s)	159.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	5.000	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0061-1500-0750-1500
Design Head (m)	0.750
Design Flow (l/s)	1.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	61
Invert Level (m)	5.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.750	1.5
Flush-Flo™	0.231	1.5
Kick-Flo®	0.479	1.2
Mean Flow over Head Range	-	1.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.3	1.200	1.9	3.000	2.8	7.000	4.2
0.200	1.5	1.400	2.0	3.500	3.0	7.500	4.3
0.300	1.5	1.600	2.1	4.000	3.2	8.000	4.5
0.400	1.4	1.800	2.2	4.500	3.4	8.500	4.6
0.500	1.3	2.000	2.3	5.000	3.6	9.000	4.7
0.600	1.4	2.200	2.4	5.500	3.7	9.500	4.9
0.800	1.5	2.400	2.5	6.000	3.9		
1.000	1.7	2.600	2.6	6.500	4.0		

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Date 23/11/2017 12:41 File 2017-11-16 Cascade.casx		Designed by JH Checked by GG			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for 2017-11-13 Basin 6.srcx</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
120 min Winter	5.446	0.536	2.0	193.2	Flood Risk
180 min Winter	5.495	0.585	2.0	215.2	Flood Risk
240 min Winter	5.530	0.620	2.0	232.0	Flood Risk
360 min Winter	5.582	0.672	2.0	257.2	Flood Risk
480 min Winter	5.619	0.709	2.0	275.9	Flood Risk
600 min Winter	5.647	0.737	2.0	290.8	Flood Risk
720 min Winter	5.671	0.761	2.1	303.0	Flood Risk
960 min Winter	5.678	0.768	2.1	307.0	Flood Risk
1440 min Winter	5.678	0.768	2.1	306.9	Flood Risk
2160 min Winter	5.659	0.749	2.1	296.8	Flood Risk
2880 min Winter	5.658	0.748	2.1	296.6	Flood Risk
4320 min Winter	5.654	0.744	2.1	294.1	Flood Risk
5760 min Winter	5.631	0.721	2.0	282.1	Flood Risk
7200 min Winter	5.587	0.677	2.0	259.7	Flood Risk
8640 min Winter	5.534	0.624	2.0	233.9	Flood Risk
10080 min Winter	5.480	0.570	2.0	208.3	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
120 min Winter	36.520	0.0	294.8	124	
180 min Winter	27.273	0.0	312.0	182	
240 min Winter	22.171	0.0	312.7	242	
360 min Winter	16.558	0.0	313.5	360	
480 min Winter	13.460	0.0	315.9	478	
600 min Winter	11.462	0.0	320.2	596	
720 min Winter	10.052	0.0	324.5	714	
960 min Winter	7.824	0.0	323.5	952	
1440 min Winter	5.496	0.0	316.9	1412	
2160 min Winter	3.861	0.0	574.6	2096	
2880 min Winter	3.005	0.0	591.3	2792	
4320 min Winter	2.244	0.0	569.5	3552	
5760 min Winter	1.824	0.0	726.4	4216	
7200 min Winter	1.554	0.0	771.9	4976	
8640 min Winter	1.362	0.0	810.9	5800	
10080 min Winter	1.219	0.0	844.7	6656	
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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 6 Basin 6																																									
Date 23/11/2017 12:41 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG																																									
Micro Drainage Source Control 2017.1.2																																										
<u>Cascade Rainfall Details for 2017-11-13 Basin 6.srcx</u> <table><tr><td>Rainfall Model</td><td>FEH</td></tr><tr><td>Return Period (years)</td><td>100</td></tr><tr><td>FEH Rainfall Version</td><td>1999</td></tr><tr><td>Site Location</td><td>GB 497050 103400 SU 97050 03400</td></tr><tr><td>C (1km)</td><td>-0.025</td></tr><tr><td>D1 (1km)</td><td>0.395</td></tr><tr><td>D2 (1km)</td><td>0.244</td></tr><tr><td>D3 (1km)</td><td>0.395</td></tr><tr><td>E (1km)</td><td>0.309</td></tr><tr><td>F (1km)</td><td>2.339</td></tr><tr><td>Summer Storms</td><td>Yes</td></tr><tr><td>Winter Storms</td><td>Yes</td></tr><tr><td>Cv (Summer)</td><td>0.750</td></tr><tr><td>Cv (Winter)</td><td>0.840</td></tr><tr><td>Shortest Storm (mins)</td><td>60</td></tr><tr><td>Longest Storm (mins)</td><td>10080</td></tr><tr><td>Climate Change %</td><td>+40</td></tr></table> <u>Time Area Diagram</u> Total Area (ha) 0.320 <table><tr><td>Time (mins)</td><td>Area</td></tr><tr><td>From:</td><td>To: (ha)</td></tr><tr><td>0</td><td>4 0.320</td></tr></table>			Rainfall Model	FEH	Return Period (years)	100	FEH Rainfall Version	1999	Site Location	GB 497050 103400 SU 97050 03400	C (1km)	-0.025	D1 (1km)	0.395	D2 (1km)	0.244	D3 (1km)	0.395	E (1km)	0.309	F (1km)	2.339	Summer Storms	Yes	Winter Storms	Yes	Cv (Summer)	0.750	Cv (Winter)	0.840	Shortest Storm (mins)	60	Longest Storm (mins)	10080	Climate Change %	+40	Time (mins)	Area	From:	To: (ha)	0	4 0.320
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Tuscany House White Hart Lane Basingstoke RG21 4AF	14-111 Drove Lane Yapton Catchment 6 Basin 6	
Date 23/11/2017 12:41 File 2017-11-16 Cascade.casx	Designed by JH Checked by GG	
Micro Drainage Source Control 2017.1.2		

Cascade Model Details for 2017-11-13 Basin 6.srcx

Storage is Online Cover Level (m) 5.710

Tank or Pond Structure

Invert Level (m) 4.910

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	278.0	0.800	548.0	0.801	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0071-2000-0700-2000
Design Head (m)	0.700
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	71
Invert Level (m)	4.910
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	2.0
Flush-Flo™	0.207	2.0
Kick-Flo®	0.450	1.6
Mean Flow over Head Range	-	1.7

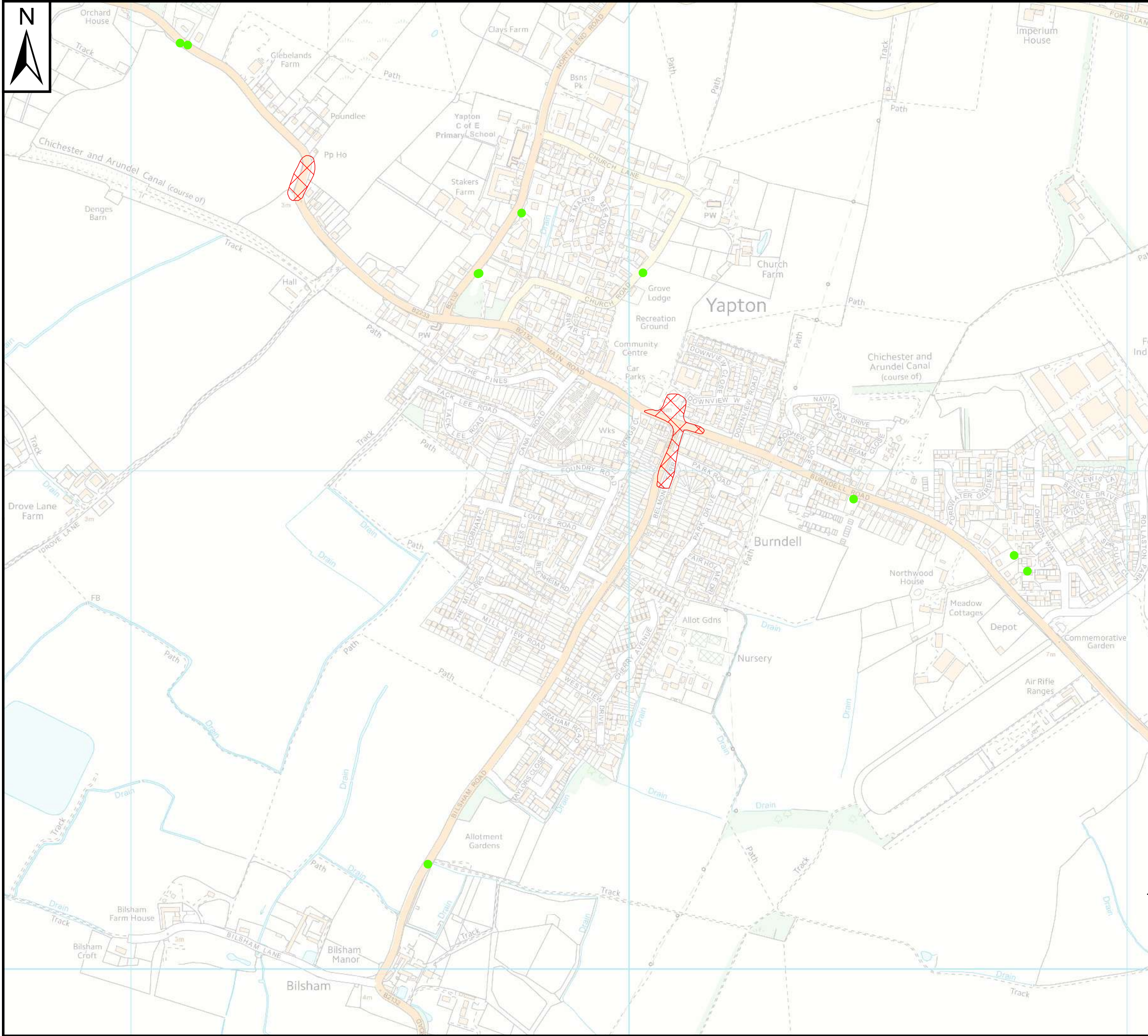
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.8	1.200	2.6	3.000	3.9	7.000	5.8
0.200	2.0	1.400	2.7	3.500	4.2	7.500	6.0
0.300	2.0	1.600	2.9	4.000	4.5	8.000	6.2
0.400	1.8	1.800	3.1	4.500	4.7	8.500	6.4
0.500	1.7	2.000	3.2	5.000	5.0	9.000	6.6
0.600	1.9	2.200	3.4	5.500	5.2	9.500	6.8
0.800	2.1	2.400	3.5	6.000	5.4		
1.000	2.4	2.600	3.7	6.500	5.6		

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APPENDIX I

Strategic Flood Risk Assessments Extracts



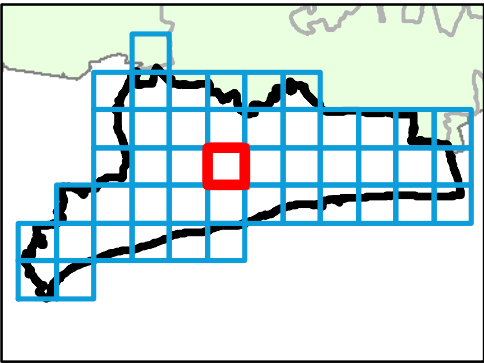
Notes

The Historic Flooding Map shows the recorded incidents and flood outlines provided by Arun District Council, West Sussex County Council, Southern Water and Environment Agency. Historical flood extent was obtained from the Environment Agency.

Flooding incidents provided have been categorised based upon the details provided in the records. Unknown flood points could not be determined from the information provided, and therefore could be from a number of sources.

Please note that not all historical records may be shown on this map, and that it is therefore advised you contact Arun District Council for updated information post 2015.

Key Plan



Legend

- Arun District SFRA boundary
- Historic flood outline
- Fluvial
- Coastal
- Tidal
- Surface Water
- Failure
- Unknown



REF	Date	Comments
A	June 2016	-
B		
C		

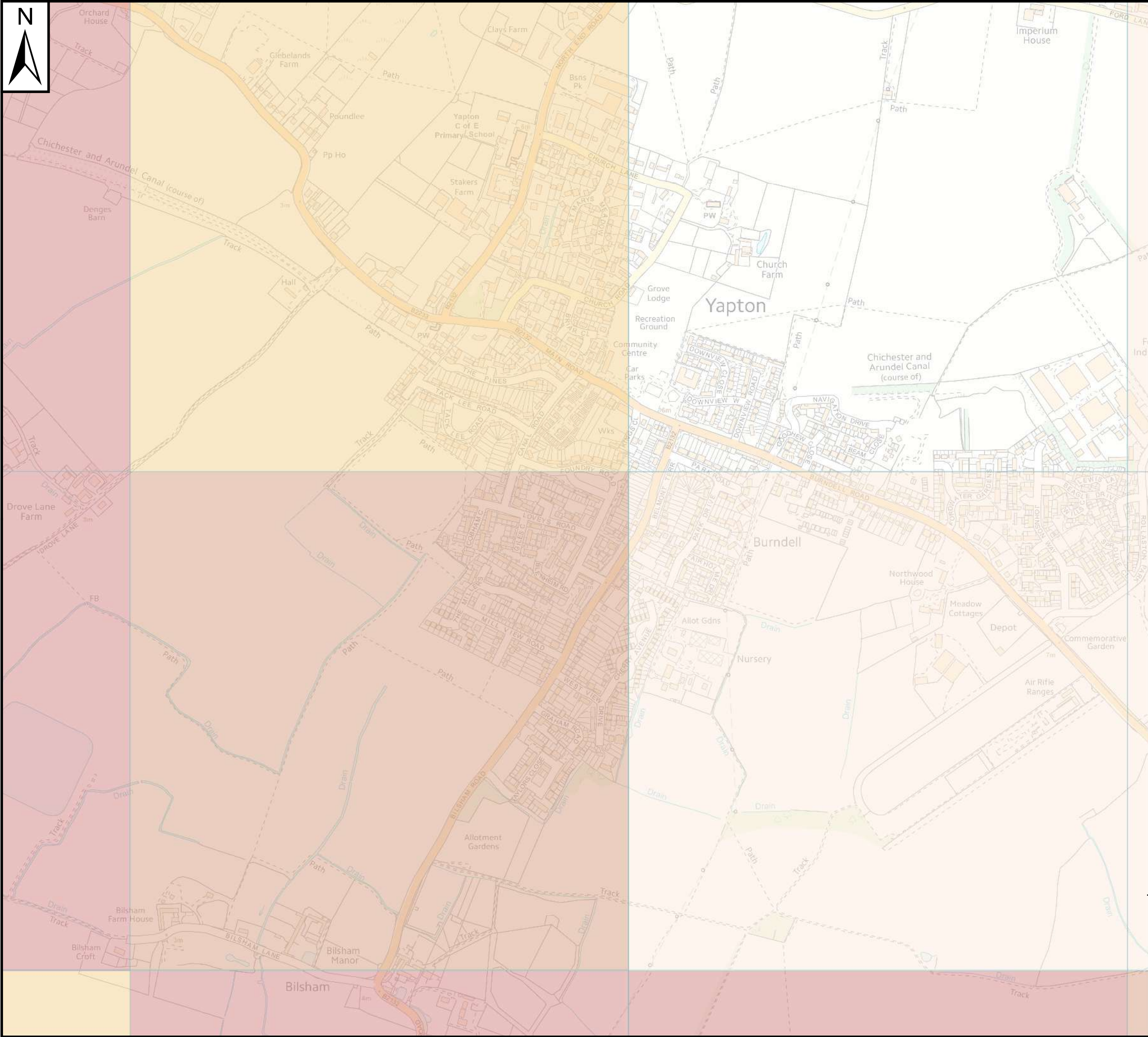
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ARUN DISTRICT COUNCIL LEVEL 1 SFRA: APPENDIX H HISTORIC FLOODING RECORDS

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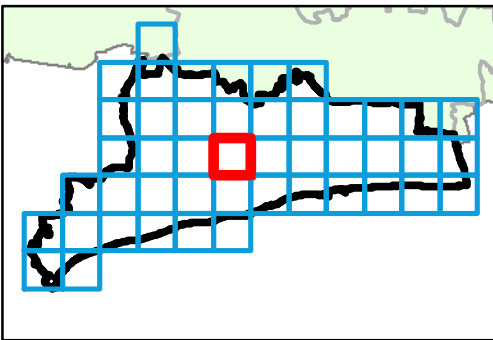
Notes

The Areas Susceptible to Groundwater Flooding (AStGWF) is a strategic scale map showing groundwater flood areas on a 1km square grid. The data was produced to annotate indicative Flood Risk Areas for Preliminary Flood Risk Assessment (PFRA) studies and allow the Lead Local Flood Authorities (LLFAs) to determine whether there may be a risk of flooding from groundwater.

This data shows the proportion of each 1km grid square where geological and hydrogeological condition show that groundwater might emerge. It does not show the likelihood of groundwater flooding occurring. It does not take account of the chance of flooding from groundwater rebound. This dataset covers a large area of land, and only isolated locations within the overall susceptible area are actually likely to suffer the consequences of groundwater flooding.

The AStGWF data should be used only in combination with other information, for example local data or historic data. It should not be used as sole evidence for any specific flood risk management, land use planning or other decisions at any scale. However, the data can help to identify areas for assessment at a local scale where finer resolution datasets exist.

Key Plan



Legend

- Arun District SFRA boundary
- < 25%
- >= 25% <50%
- >= 50% <75%
- >= 75%



REF	Date	Comments
A	June 2016	-
B		
C		

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ARUN DISTRICT COUNCIL

LEVEL 1 SFRA: APPENDIX F AREAS SUSCEPTIBLE TO GROUNDWATER

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